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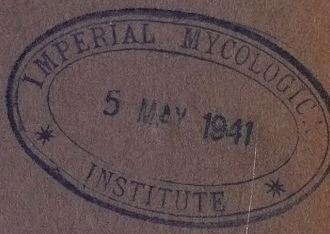

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CONTENTS

LIST OF CHIEF SUBJECTS

[Many subjects dealt with are omitted from the list and will be found in the appropriate places. Particular subjects sometimes appear under different headings: *e.g.* Tuberculosis may appear under :– Diseases Caused by Bacteria and Fungi; Immunity; Diseases, General (papers on several diseases); Public Health; Therapeutics; Technique; Reports and Book Reviews].

	PAGE
DISEASES CAUSED BY BACTERIA AND FUNGI [see also Immunity] ...	277–290
Streptococci	... 277
Staphylococci	... 279
Anthrax	... 279
Tuberculosis	... 280
Corynebacteria	... 283
Pasteurella infection ...	... 284
Salmonella infection ...	... 285
Brucella infection	... 287
Anaerobic infections... ...	... 288
DISEASES CAUSED BY PROTOZOAN PARASITES	290–294
Trypanosomiasis	... 290
Avian malaria	... 292
Piroplasmosis	... 293
DISEASES CAUSED BY VIRUSES ...	294–302
Foot and mouth disease ...	... 294
Equine infectious anaemia ...	... 295
Rabies	... 296
Canine distemper	... 297
Influenza	... 298
Fowl plague	... 300
PARASITES IN RELATION TO DISEASE [ARTHROPODS]	302–303
PARASITES IN RELATION TO DISEASE [HELMINTHS]	303–304
IMMUNITY [including Allergic and Serological Diagnosis] ...	304–307
Serological diagnosis ...	... 304
DISEASES, GENERAL [General diseases not dealt with under other headings: Organic diseases, Miscellaneous diseases and Neoplasms]	307–314
NUTRITION IN RELATION TO DISEASE [see also Diseases general and Physiology]	314–319
Mineral deficiency	... 315
Vitamin deficiency	317
PUBLIC HEALTH	320–322
Milk hygiene	... 320
Meat hygiene	... 320
THERAPEUTICS	322–326
Sulphonamide compounds ...	... 322
POISONS AND POISONING ...	326–327
PHYSIOLOGY	327–330
TECHNIQUE AND APPARATUS ...	330–333
MISCELLANEOUS	333–334
REPORTS	334–344
India	... 334
Australia	... 336
Southern Rhodesia	... 338
Basutoland	... 339
British Somaliland	... 339
Northern Rhodesia	... 340
Nyasaland	... 341
Sierre Leone	... 341
Mauritius	... 342
Zanzibar	... 342
Burma	... 342
British Guiana	... 343
French West Africa	... 343
BOOK REVIEW	344

INDEX TO AUTHORS

Ahmedi, F. D., 342.
Allan, P., 281.
Andrewes, C. H. See Horsfall, F. L., et al., jt. authors, 299.
Arlein, M. S., 300.
Arnold, A., & Elvehjem, C. A., 317.
Austin, J. A. See Brown, H. P., jt. author, 326.
Australia, 336, 337, 338.

Bailly, J. See Remlinger, P., jt. author, 297.
Baker, A. H. See Twort, C. G., jt. author, 322.
Baker, D. W. See Salisbury, G. W., et al., jt. authors, 325.
Balozet, L., 295, 297.
—, & Receveur, P., 283.
Basutoland, 339.
Batt, H. T., 314, *bis*.
Bauer, J. H., & Pickels, E. G., 331.
Beath, O. A. See Bradley, W. B., et al., jt. authors, 327.
Beck, N. See Newton, W. H., jt. author, 330.
Bedson, S. P., 302.
Behrens, D. See Neumann-Kleinpaul, K., jt. author, 327.
Benedek, T., 332.
Bertram, D. S. See Lumsden, W. H. R., jt. author, 292.
Bird, H. R., & Culton, T. G., 318.
Blaustéin, J. B., 283.
Boley, L. E., & Graham, R., 309.
Bonadonna, T., 333.
Bonnier, G., & Trulsson, S., 338.
Boquet-Jesensky, M. See Pierre-Bourgeois, et al., jt. authors, 326.
Boyd, E. M. See Clarke, E. L., jt. author, 329.
Bradley, W. B., Eppson, H. F., & Beath, O. A., 327.
Braga, A., 330.
Brandt, A. See Danbolt, N., jt. author, 281.
Bratton, A. C. See Marshall, E. K., Jr., et al., jt. authors, 322.
British Guiana, 343.
British Somaliland, 339.
Britton, J. W. See Salisbury, G. W., et al., jt. authors, 325.
Brouwer, E., & Dijkstra, N. D., 314.
Brown, H. P., & Austin, J. A., 326.
Bruner, D. W. See Edwards, P. R., jt. author, 286.
—. See also Edwards, P. R., et al., jt. authors, 286.
Bull. Serv. zootech. Epiz. A. O. F., 343.
Burbank, R. See Hume, E. M., et al., jt. authors, 317.
Burma, 342.
Burrows, W. H., & Quinn, J. P., 333.
—. See also Titus, H. W., jt. author, 317.

Campbell, D. H., 303.
Carmichael, J., 281.
Carneiro, V., 296.
Caullery, M., 310.
Chambers, E. G., 344.
Chapman, G. H., & Stiles, M. H., 279.
Chorine, V., 331.
Chorley, J. K., 302.
Clarke, E. L., & Boyd, E. M., 329.
Cloudman, A. M. See Little, C. C., et al., jt. authors, 312.
Coggeshall, L. T., 324.
Colony of Mauritius, 342.
Cooper, M. L., & Grabill, F. J., 330.
Cordy, D. R., 307.
Corper, H. J., 282.
Corwin, G. E., 320.
Cowsert, W. C. See Ralston, N. P., et al., jt. authors, 328.
Craig, J. F., & Davies, G. O., 284.
Cravens, W. W. See Holmes, C. E., jt. author, 317.
Crew, F. A. E., 310.
Crowley, A. B. See Geiger, J. C., et al., jt. authors, 300.
Culton, T. G. See Bird, H. R., jt. author, 318.
Cummings, J. R. See Gunnison, J. B., et al., jt. authors, 277.

Dam, H., & Glavind, J., 318.
Danbolt, N., & Brandt, A., 281.
Davidson, C. L. See Fowweather, F. S., et al., jt. authors, 312.
Davies, G. O. See Craig, J. F., jt. author, 284.
Davis, G. K., Freeman, V. A., & Madsen, L. L., 316.
Dawson, M. H., & Hobby, G. L., 323.
Day, F. T., & Miller, W. C., 328.
Deem, A. W., & Thorp, F., Jr., 327.
Dienes, L. See Sullivan, E. R., jt. author, 289.
Dijkstra, N. D. See Brouwer, E., jt. author, 314.
Dixon, J. A., 321.
Dobberstein, 295.
Dorin, E., 282.
Dubois, C., & Sollier, N., 288.
Duffield, J. W., 332.
Duke, F. W., 320.
Dumoff, M., 289.

Eaton, O. N., & Simmons, V. L., 311.
Eddie, B. U. See Geiger, J. C., et al., jt. authors, 300.
Edward, D. G. ff., 290.
Edwards, P. R., & Bruner, D. W., 286.
—, —, & Rubin, H. L., 286.
Ellis, L. See Fowweather, F. S., et al., jt. authors, 312.
Elvehjem, C. A. See Arnold, A., jt. author, 317.
—. See also Wiese, A. C., et al., jt. authors, 315.
Ely, F., Hull, F. E., & Morrison, H. B., 311.
Emerson, G. A. See Evans, H. M., jt. author, 318.
Eppson, H. F. See Bradley, W. B., et al., jt. authors, 327.
Erhardt, A., 325.
Eskridge, L. C. See Landsberg, J. W., jt. author, 293.
Evans, H. M., & Emerson, G. A., 318.
Eveleth, D. F., Eveleth, M. W., & Walsh, F. E., 315.
Eveleth, M. W. See Eveleth, D. F., et al., jt. authors, 315.

Falconer, M. A. See Russel, D. S., jt. author, 323.
Feldman, W. H., Hinshaw, H. C., & Moses, H. E., 323.
—. See also Greene, L. F., jt. author, 311.
Fester, A. See Gavrilov, W., jt. author, 313.
Fiennes, R. N. T.-W., 287.
Fish, M. See Madison, R. R., et al., jt. authors, 305.
Fouts, P. J., Helmer, O. M., & Lepkovsky, S., 317.
Fowweather, F. S., Davidson, C. L., & Ellis, L., 312.
Francis, T., Jr., 299.
Fraser, H. A., 343.
Fraser, W. A. C., 309, 338.
Freeman, V. A. See Davis, G. K., et al., jt. authors, 316.
French West Africa, 343.
Frick, O. See Madison, R. R., et al., jt. authors, 305.
Friedemann, T. E., 279, *bis*.
Friedewald, W. F., 313.
Frost, B. M., 289.
Fuerstmer, P. G., & Sargent, F., 312.

Galliard, H., 304.
Gauger, H. C. See Satterfield, G. H., et al., jt. authors, 317.
Gavrilov, W., & Fester, A., 313.
Geiger, J. C., Crowley, A. B., Meyer, K. F., & Eddie, B. U., 300.
Giovannola, A., 292.
Glavind, J. See Dam, H., jt. author, 318.
Glover, R. E., 309.
van Goidsenhoven, C., & Schoenaers, F., 324.
Grabill, F. J. See Cooper, M. L., jt. author, 330.
Graham, R. See Boley, L. E., jt. author, 309.
Grainger, J., 302.
Gray, E., 326.
Green, R. G. See Larson, C. L., jt. author, 303.
Greene, L. F., & Feldman, W. H., 311.
Greig, J. R., 308, *bis*.
Griffith, A. S., & Smith, J., 281.
Griffith, W. H., 319.
—, & Wade, N. J., 319.
Grubb, T. C. See Heyman, B., jt. author, 324.
Gudakunst, D. W. See Newitt, A. W., et al., jt. authors, 320.
Gunnison, J. B., Luxen, M. P., Cummings, J. R., & Marshall, M. S., 277.
Gwan, O. S., 281.

Hanozet, G. See Liégeois, F., jt. author, 308.
Hart, E. B. See Wiese, A. C., et al., jt. authors, 315.
Helmer, O. M. See Fouts, P. J., et al., jt. authors, 317.
Henderson, G. T., 339.
Hepding, L. See Kuhn, R., et al., jt. authors, 319.
Herman, H. A., & Ragsdale, A. C., 333.
—. See also Ralston, N. P., et al., jt. authors, 328.
Heyman, B., & Grubb, T. C., 324.
Hinshaw, H. C. See Feldman, E. H., et al., jt. authors, 323.
Hirato, K. See Kasai, K., jt. author, 286.
Hiscox, E. R. See Mattick, A. T. R., jt. author, 320.
Hobby, G. L. See Dawson, M. H., jt. author, 323.
Holman, H. J., 324.
Holmes, A. D. See Satterfield, G. H., et al., jt. authors, 317.
Holmes, C. E., & Cravens, W. W., 317.
Horsfall, F. L., Lennette, E. H., Rickard, E. R., Andrewes, C. H., Smith, W., & Stuart-Harris, C. H., 299.
Horsfall, F. L., Jr., 330.
Houston, J., Kon, S. K., & Thompson, S. Y., 320.
Howitt, B. F., 296.
Huddleson, I. F., & Munger, M., 320.
Hull, F. E. See Ely, F., et al., jt. authors, 311.
Hume, E. M., Burbank, R., & Korenchevsky, V., 317.
Hutson, L. R., 294.

India. Proc. 2nd Meet. anim. Husb. Wing, Bd Agric. 1936, 334.
—. Rep. Mysore Serum Inst., 1937-38, 336.
Indian Fmg, 333.
Iványovics, G., 279, 280, *bis*.
Iyer, S. G., 300.

Jardine, E. F., 307.
Jewell, M. L. See Rantz, L. A., jt. author, 277.
Johnson, B. C. See Wiese, A. C., et al., jt. authors, 315.
Johnson, D. W., Palmer, L. S., & Nelson, J. W., 315.
Jones, B. F., & Stewart, H. L., 307.
Jungherr, E., 318.

Kasai, K., & Hirato, K., 286.
Kauffmann, F., 285, *bis*.
Keller, W. N. See Larson, C. P., et al., jt. authors, 326.
Kenney, A. S. See Shaw, D. R., et al., jt. authors, 299.
Kermack, W. O., & McKendrick, A. G., 307.
Kernkamp, H. C. H., 296.
King, R. E., 325.
Klieneberger, E., 289.
—, & Steabben, D. B., 290.
Kon, S. K. See Houston, J., et al., jt. authors, 320.

Koppa, T. M. See Newitt, A. W., et al., jt. authors, 320.
Korenchevsky, V. See Hume, E. M., et al., jt. authors, 317.
Kubo, M., 304.
Kuhn, R., Wallenfels, K., Weygand, F., Moll, T., & Hepding, L., 319.
Kujumgieff, I., 305.
Kuwabara, T., 280.

Lancefield, R. C., 278, *bis*.
Lancet, 326.
Landsberg, J. W., & Eskridge, L. C., 293.
Larson, C. L., & Green, R. G., 303.
Larson, C. P., Keller, W. N., & Manges, J. D., 326.
Lavin, G. I. See Smithburn, K. C., jt. author, 283.
Lawrence, D. A., 338.
Lemetayer, E. See Ramon, G., jt. author, 289.
Lennette, E. H. See Horsfall, F. L., et al., jt. authors, 299.
Lepkovsky, S. See Fouts, P. J., et al., jt. authors, 317.
Lester, H. M. O., 290.
Letard, E., 311.
Liégeois, F., & Hanozet, G., 308.
Lionnet, F. E., 342.
Lipschütz, A., & Vargas, L., Jr., 313.
Litchfield, J. T., Jr. See Marshall, E. K., Jr., et al., jt. authors, 322, 323.
Little, C. C., Murray, W. S., & Cloudman, A. M., 312.
Loh, G. L. See MacGregor, R. G. S., et al., jt. authors, 332.
Lovell, R., & White, E. G., 280.
Lumsden, W. H. R., & Bertram, D. S., 292.
Lutje, F., 286.
Luxen, M. P. See Gunnison, J. B., et al., jt. authors, 277.

McFarlane, A. S., 301.
MacGregor, R. G. S., Richards, W., & Loh, G. L., 332.
McKendrick, A. G. See Kermack, W. O., jt. author, 307.
MacLeod, J., 303.
Madison, R. R., Fish, M., & Frick, O., 305.
Madsen, L. L. See Davis, G. K., et al., jt. authors, 316.
Majatico, G., 297.
Maltaner, F. See Thompson, W. R., jt. author, 306.
Maner, R., 332.
Manges, J. D. See Larson, C. P., et al., jt. authors, 326.
Marshall, E. K., Jr., Bratton, A. C., White, H. J., & Litchfield, J. T., Jr., 322.
—, Litchfield, J. T., Jr., & White, H. J., 323.
Marshall, M. S. See Gunnison, J. B., et al., jt. authors, 277.
Martin, L. A., 295.
Masterman, A. T., 322.
Mattick, A. T. R., & Hiscox, E. R., 320.
Mayer, R. L., 322.
Mazzaracchio, V., 294.
Mercier, L., 313.
Meyer, K. F. See Geiger, J. C., et al., jt. authors, 300.
Meyn, A. See Schmidt, J., jt. author, 285.
de Meza, J., 341.
Michelson, L., & Wilcox, A., 332.
Mielnik-Kośmiderski, S., 279.
Miller, M. E., 330.
Miller, W. C. See Day, F. T., jt. author, 328.
Mitchell, D. T., 342.
Mizuguchi, Y. See Watanabe, Y., jt. author, 283.
Mohr, A., 332.
Mohr, O. L., 310.
Moll, T. See Kuhn, R., et al., jt. authors, 319.
Morris, J. P. A., 340.
Morrison, H. B. See Ely, F., et al., jt. authors, 311.
Mosely, M. A. See Satterfield, G. H., et al., jt. authors, 317.
Moses, H. E. See Feldman, W. H., et al., jt. authors, 323.
Mucciolo, P., 303.
Munger, M. See Huddleson, I. F., jt. author, 320.
Muñoz, M., 328.
Murray, W. S. See Little, C. C., et al., jt. authors, 312.

Nakazima, T., 306.
Negri, R., 294.
Nelson, J. W. See Johnson, D. W., et al., jt. authors, 315.
Neumann-Kleinpaul, K., & Behrens, D., 327.
Newitt, A. W., Koppa, T. M., & Gudakunst, D. W., 320.
Newton, W. H., & Beck, N., 330.
Nieberle, K., 310.
Nisi, T., 287.
Northern Rhodesia, 340.
Nyasaland Protectorate, 341.

Onmyoji, M. See Saiki, S., jt. author, 288.
—. See also Saiki, S., et al., jt. authors, 288.

Palmer, L. S. See Johnson, D. W., et al., jt. authors, 315.
Panisset, L., 298.
Parker, G. H., 329.
Peck, E. F., 307, 339.
Penso, G., 291.
Petragnani, G., 294.
Pickels, E. G. See Bauer, J. H., jt. author, 331.
—. See also Smadel, J. E., et al., jt. authors, 301.
Pierre-Bourgeois, Boquet-Jesensky, M., & Pierre-Bourgeois, D., 326.
Pierre-Bourgeois, D. See Pierre-Bourgeois, et al., jt. authors, 326.
Pomerantz, L. See Sutra, C. J., jt. author, 329.
Proc. 43rd ann. Meet. U. S. Live Stk sanit. Ass., 1939, 296, *ter*, 320, 321.

Quinn, J. P. See Burrows, W. H., jt. author, 333.

Ragsdale, A. C. See Herman, H. A., jt. author, 333.
—. See also Ralston, N. P., et al., jt. authors, 328.
Ralston, N. P., Cowsert, W. C., Ragsdale, A. C., Herman, H. A., & Turner, C. W., 328.
Ram, C., 293.
Ramon, G., & Lemetayer, E., 289.
Rankin, A. D., 328.
Rantz, L. A., & Jewell, M. L., 277.
Receveur, P. See Balozet, L., jt. author, 283.
Reis, J., 284.
Remlinger, P., & Bailly, J., 297.
Rep. Coun. sci. industr. Res. Aust., 1937-38, 336, 337.
Rep. Dep. Agric. Basutoland, 1938-39, 339.
Rep. Dep. Agric. Brit. Guiana, 1938, 343.
Rep. Dep. Agric. Mauritius, 1938, 342.
Rep. Dep. Agric. Sierra Leone, 1938, 341.
Rep. Dep. Agric. Zanzibar, 1939, 342.
Reymann, G. C. See Walbum, L. E., jt. author, 289.
Richards, W. See MacGregor, R. G. S., et al., jt. authors, 332.
Rickard, E. R. See Horsfall, F. L., et al., jt. authors, 299.
Ringer, I. W., 320.
Rivers, T. M. See Smadel, J. E., et al., jt. authors, 301.
Roach, S. A., 341.
Rodrigues, C., 288.
Ross, F. U., 292.
Rubin, H. L. See Edwards, P. R., et al., jt. authors, 286.
Russel, D. S., & Falconer, M. A., 323.
Russo, E., 284.

van Saceghem, R., 324.
Saiki, S., & Onmyoji, M., 288.
—, —, & Tsukamoto, K., 288.
Salisbury, G. W., Baker, D. W., & Britton, J. W., 325.
Sargent, F. See Fuerstmer, P. G., jt. author, 312.
Satterfield, G. H., Mosely, M. A., Gauger, H. C., Holmes, A. D., & Tripp, F., 317.
Saunders, A. R., 334.
Schmidt, H., 314.
Schmidt, J., & Meyn, A., 285.
Schoenaers, F. See van Goidsenhoven, C., jt. author, 324.
Scott, J. P., 298.
Shaw, D. R., Kenney, A. S., & Stokes, J., 299.
Shedlovsky, T., & Smadel, J. E., 301.
—. See also Smadel, J. E., et al., jt. authors, 301.
Sheng, T., 284.
Shoetensack, H. M., 297, *bis*.
Sierra Leone, 341.
Simmons, V. L. See Eaton, O. N., jt. author, 311.
Singer, A. J., 306.
Sjöberg, K., 315.
Smadel, J. E., Pickels, E. G., Shedlovsky, T., & Rivers, T. M., 301.
—. See also Shedlovsky, T., jt. author, 301.
Smith, J. See Griffith, A. S., jt. author, 281.
Smith, S. E., 312.
Smith, W. See Horsfall, F. L., et al., jt. authors, 299.
Smithburn, K. C., & Lavin, G. I., 283.
Sollier, N. See Dubois, C., jt. author, 288.
Southern Rhodesia, 338.
Stanley, W. M., 301.
Steabben, D. B. See Klieneberger, E., jt. author, 290.
Stewart, H. L. See Jones, B. F., jt. author, 307.
Stiles, M. H. See Chapman, G. H., jt. author, 279.
Stokes, J. See Shaw, D. R., et al., jt. authors, 299.
Stone, W. S., 287.
Straub, M., 299.
Strong, K. C., 308.
Stuart-Harris, C. H. See Horsfall, F. L., et al., jt. authors, 299.
Sullivan, E. R., & Dienes, L., 289.
Sunderville, E. J., 287.
Sutra, C. J., & Pomerantz, L., 329.
Swaine, J. M., 334.

Thompson, S. Y. See Houston, J., et al., jt. authors, 320.
Thompson, W. R., & Maltaner, F., 306.
Thorp, F., Jr. See Deem, A. W., jt. author, 327.
Tischhauser, L. A., 307.
Titus, H. W., & Burrows, W. H., 317.
Todd, A. W. See Todd, T. W., et al., jt. authors, 309.
Todd, T. W., Wharton, R. E., & Todd, A. W., 309.
Tripp, F. See Satterfield, G. H., et al., jt. authors, 317.
Trulson, S. See Bonnier, G., jt. author, 333.
Tsukamoto, K. See Saiki, S., et al., jt. authors, 288.
Turner, C. W. See Ralston, N. P., et al., jt. authors, 328.
Twort, C. G., & Baker, A. H., 322.

Ubertini, B., 277.
Underhill, G. W., 302.

Vallée, M., 288.
Vargas, L., Jr. See Lipschütz, A., jt. author, 313.
Vaz, Z., 304.
Velasquez, J. G., 292.
Vellisto, E., 287, 304, 305, *bis*.

Vet. Bull. U. S. Army, 297.
Vianello, G., 295.

Wade, N. J. See Griffith, W. H., jt. author, 319.
Walbum, L. E., & Reymann, G. C., 289.
Wallenfels, K. See Kuhn, R., et al., jt. authors, 319.
Walsh, F. E. See Eveleth, D. F., et al., jt. authors, 315.
Watanabe, Y., & Mizuguchi, Y., 283.
Watts, P. S., 333.
Weineck, E., 300.
Weygand, F. See Kuhn, R., et al., jt. authors, 319.
Wharton, R. E. See Todd, T. W., et al., jt. authors, 309.
White, E. G. See Lovell, R., jt. author, 280.
White, H. J. See Marshall, E. K., Jr., et al., jt. authors, 322, 323.
Wiese, A. C., Johnson, B. C., Elvehjem, C. A., & Hart, E. B., 315.
Wilcox, A. See Michelson, L., jt. author, 332.

Zanzibar Protectorate, 342.

The Editor will be glad to receive publications relating to Veterinary Science and cognate subjects in order that they may be dealt with in the *Veterinary Bulletin*.

Reports of Departments, Special Reports, reprints, etc., etc., should be sent as soon as they are issued.

Books for Review.

The Editor will be glad to receive books for review in the *Veterinary Bulletin*.

INDEX VETERINARIUS.

See notice on page 3 of cover.

IMPERIAL BUREAU OF ANIMAL HEALTH

THE

VETERINARY BULLETIN

Vol. 11.] May, 1941. [No. 5.

DISEASES CAUSED BY BACTERIA AND FUNGI

UBERTINI, B. (1939). La setticemia diplococcica (Diplococco lanceolato di Fränkel) nei bovini adulti. [**Pneumococcus Septicaemia (*Streptococcus pneumoniae* Infection) in Adult Bovines**].—*Clin. vet., Milano.* **62.** 6–11. 3 figs. [10 refs.]

An account of illness in two cows in which it is stated that the pneumococcus was present in the organs when examined P.M. One died after 24 hours of febrile illness, and the other after an illness lasting ten days following calving and utero-peritoneal complications.

RANTZ, L. A., & JEWELL, Marjorie L. (1940). **The Relationship of Serologic Groups A, B, and C of Lancefield to the Type of Hemolysis Produced by Streptococci in Poured Blood Agar Plates.**—*J. Bact.* **40.** 1–8. 3 figs. on 1 plate. [9 refs.]

The authors have studied the characters in poured blood agar plates of 1,179 strains of haemolytic streptococci belonging to groups A to K (Lancefield). Observations were also made on surface plates but were found of little value. It is believed that certain types of haemolysis are characteristic of certain groups.

They report that 1,104 strains belonging to group A had similar characteristics, *viz*, briefly, a sharply defined 1·5–3·5 mm. zone of complete haemolysis around the colony at 24 hours, the size of the zone being constant for given strains and nearly alike for all strains of the group; it altered little after refrigeration.

Twenty-three haemolytic group B strains showed similar characters quite distinct from those of other groups. Haemolysis was incomplete at 24 hours. At 48 hours it was complete, but at this time (or after refrigeration) it was surrounded by the hazy zone of partial haemolysis already described by BROWN: his so-called double zone haemolysis.

Nineteen group C strains were alike in producing at 24 hours a wide zone of haemolysis which was complete for 3 mm. but less complete beyond and which increased considerably after further incubation. This type of haemolysis was, however, found in groups D-K. Only a few strains of these latter groups were examined, but no group characteristic haemolytic effect was found. It is suggested that with standard poured plates a valuable indication of probable group can be obtained.

—A. W. STABLEFORTH.

GUNNISON, J. B., LUXEN, M. P., CUMMINGS, J. R., & MARSHALL, M. S. (1940). **The Differentiation of Hemolytic Streptococci from Various Sources by the Group Precipitin Reaction, and by Biochemical Tests.**—*J. Bact.* **39.** 689–708. 2 tables. [Numerous refs.]

561 cultures of haemolytic streptococci from various sources around San Francisco were studied by the group precipitin reaction and by various biochemical tests. Out of 241 cultures from human sources 156 fell in group A, 13 in group B, 9 in group C, 6 in group D, 1 in group F, 28 in group G, and 3 in group H, while 25 failed to react with any antiserum. Of 188 strains associated with infections, 142 belonged to group A; of 53 cultures not so associated only 14 were of group A. The majority of non-group A cultures came from the throat or urino-genital tract, with little

evidence that they were responsible for infection.

Most of the 320 cultures from animal sources came from milk; 263 of them were in group B, 12 in group A, 15 in group C, 2 in group D, 4 in group E, 10 in group G, and 1 in group H, with 13 unclassified. The general distribution of the groups in this area (San Francisco) was not unlike that reported from other parts of the world.

The various groups of haemolytic streptococci could not be identified by any combination of biochemical reactions studied. For preliminary differentiation and identification of certain sub-groups, fermentation tests with sorbitol, trehalose, salicin, lactose, and possibly raffinose were of value, as also were tests for hydrolysis of sodium hippurate. The uses of glycerol and mannitol fermentation tests, curdling of milk, hydrolysis of starch, and production of soluble haemolysin were of little or no differential value for the cultures investigated.

Half of the group B cultures formed double zones of haemolysis in blood plates, but these zones were not produced by any cultures of other groups.

The group precipitin test, using either a one-tube modification of the original Lancefield technique or Brown's microscopic method, was found to be a simple, reliable, and practical procedure in the routine identification of haemolytic streptococci and to possess far greater accuracy than any other test or group of tests so far employed.—ALFRED EDEN.

I. LANCEFIELD, Rebecca C. (1940). **Type-Specific Antigens, M and T, of Matt and Glossy Variants of Group A Hemolytic Streptococci.**—*J. exp. Med.* **71.** 521–537. 7 tables. [12 refs.]

II. LANCEFIELD, Rebecca C. (1940). **The Significance of M and T Antigens in the Cross Reactions between Certain Types of Group A Hemolytic Streptococci.**—*Ibid.* 539–550. 6 tables. [6 refs.]

I. It has long been known that types exist amongst group A streptococci and that these can be demonstrated by agglutination or precipitation methods or by passive protection tests made on mice. It was more recently shown that a protein substance (M) was apparently responsible for these reactions. This type specific substance (M) is characteristic of the matt or mucoid form of group A streptococci but is absent, or nearly so, in the degenerate glossy (or smooth) variant. In spite of the absence of the M substance, however, the glossy variant still shows one marked type specific feature, *viz*, it is agglutinated specifically by immune sera and on injection gives rise to sera which agglutinate both matt and glossy variants specifically although they give no precipitate with M substance and do not usually protect mice against virulent matt organisms. L. now shows that matt variants of group A haemolytic streptococci possess two qualitatively different type-specific antigens, M and T, but that the glossy variant has only the T antigen. She has already shown that M is of protein nature; the nature of T is not yet known. Antibody to the type specific protein M appears responsible for the M precipitation reaction, for type specific passive protection and as a rule for part of the type specific agglutination of matt variants; but in type 1 streptococci it plays no part in the agglutination.

Antibody to the antigen T seems to be solely responsible for the type specific agglutination of the glossy form, and to play a large part in the agglutination of the matt form but is apparently not involved in protection. It is solely responsible for agglutination in type 1. Consequently type 1 matt and glossy variants agglutinate and absorb alike, and antisera to both are alike in respect of type specific agglutinin content though they differ in respect of M antibody. It is suggested with certain reservations that glossy variants might be used for classification by agglutination. These glossy variants are suitable for preparing type-specific agglutinating sera and form stable suspensions. Improved methods are, however, needed for obtaining glossy from matt variants.

II. In the work described in I, in which numbers of four serological types of group A, *viz*, types 1, 3, 6, and 14 were studied, the type specific protein antigen, M, found in the matt variant and the newly recognized type specific factor, T, found in both matt and glossy variants, were correlated with a particular type, *i.e.* a given strain had the M protein of its type and the T factor of the same type.

It is now reported that the well known strain C 203 possesses the M and T factors characteristic of type 3 and also the T factor characteristic of type 1. It has, however, no type 1 M substance. The hitherto confusing reactions of the strain are thus explained. It is likely that other strains with anomalous characters exist.—A. W. STABLEFORTH.

CHAPMAN, G. H., & STILES, M. H. (1940). **Carbohydrate Fermentation Reactions of Staphylococci.**—*Amer. J. clin. Path.* **10.** 380–386. [9 refs.]

The results of a study of the fermentation of carbohydrates by staphylococci are reported and compared with certain reactions of the cultures usually associated with pathogenicity. Pathogenic strains as a group had greater fermenting power than non-pathogenic strains. Most staphylococci, without regard for their *in vitro* reactions ferment dextrose, laevulose, saccharose, glycerol, and maltose within 18 hours, and fail to ferment within five days dextrin, cellobiose, salicin, inulin, inositol, dulcitol, *l*-arabinose, *l*-xylose, raffinose, rhamnose, starch, melibiose, adonitol, *d*-sorbitol and melezitose, incorporated into a basal medium of tryptose and beef extract agar with phenol red indicator. Lactose and *d*-galactose gave parallel results with 119 out of 125 cultures, but the reactions were not associated with the coagulating, chromogenic, haemolytic, and crystal violet agar properties of the cultures. Fermentation of *d*-mannose, *d*-mannitol and trehalose was more closely associated with these *in vitro* properties, the degree of correlation increasing in that order. The association of fermentation of *d*-mannose, *d*-mannitol, and trehalose is of interest as many investigators considered fermentation of *d*-mannitol to be a characteristic property of pathogenic streptococci. Two of the cultures employed, producing atypical growths, fermented carbohydrates which were not fermented by 97% of the cultures. Four cultures which fermented cellobiose and four of the five fermentors of salicin had *in vitro* properties characteristic of highly pathogenic staphylococci.—A. EDEN.

I. FRIEDEMANN, T. E. (1939). **The Carbohydrate Metabolism of Staphylococcus Aureus.**—*J. biol. Chem.* **130.** 61–65. 2 tables. [10 ref.]

II. FRIEDEMANN, T. E. (1939). **The Carbohydrate Metabolism of Streptococci.**—*Ibid.* 757–761. 1 table. [14 refs.]

I. Organisms from a young culture of *Staph. aureus* were inoculated into an accurately measured volume of culture medium which contained 1% of glucose and 0·7–1·8% $Na_2HPO_4.12H_2O$ and incubated for 18–24 hours. Lactic acid was the principal metabolic product, 77–91% being produced, while the yield of ethyl alcohol varied from 2–17%. It is suggested that the two principal reactions involved in the intermediary metabolism of glucose by rapidly growing staphylococci in complex carbohydrate-rich culture media appear to be first, conversion of the greater part of the sugar into lactic acid and second, further splitting of the 3-carbon intermediates into ethyl alcohol and CO_2.

II. Lactic acid was the chief metabolic product resulting from the growth of representative strains of green-forming streptococci and from the growth of other Gram-positive cocci in a beef infusion culture medium to which had been added 1% peptone, 1·8% $Na_2HPO_4.12H_2O$, and 0·9% dextrose. Smaller quantities of formic acid, acetic acid and ethyl alcohol were produced. These products accounted for about 80–95% of the carbon of the metabolized sugar.—R. ALLCROFT.

MIELNIK-KÓSMIDERSKI, S. (1939). Ueber die Beeinflussung der Phagozytose durch die Bakterienkapsel und bakterielle Polysaccharide. **[The Influence of the Bacterial Capsule and of Bacterial Polysaccharide upon Phagocytosis].**—*Z. ImmunForsch.* **95.** 203–217. 1 fig., 6 tables. [16 refs.]

M. has used for his study the so-called *Rhinoschleroma* bacterium. From a study of the phagocytosis of young capsulated and old cultures, and of the effect of the presence of various concentrations of the corresponding polysaccharide and of polysaccharides from other organisms, it is concluded that the carbohydrate fraction has a specific effect on phagocytosis and plays an important part in pathogenic activity.—A. W. STABLEFORTH.

IVÁNOVICS, G. (1939). Das Schicksal der Kapselsubstanz (P-Substanz) der Milzbrandbazillen im Organismus. **[The Fate of the Capsule Substance (P-Substance) of Anthrax Bacilli in the Body of the Host].**—*Z. ImmunForsch.* **96.** 408–412. 1 fig., 2 tables. [7 refs.]

The author concludes from his experiments that the capsule substance of *Bacillus anthracis*, the polypeptide of *d*-glutamic acid, cannot be broken down in the body of the rabbit. The circulating capsule substance is not bound by the tissues but excreted by the kidneys unchanged. He suggests that it is for this reason that it displays no antigenic properties.

After preliminary experiments on mice had been made, rabbits were injected intravenously with 70–150 mg. per kg. of the capsule sub-

stance. Titrations of the serum were made at intervals and several examinations of naturally voided urine were also made. After dosage sufficient to give a titre of 1 : 10,000 at half-an-hour the serum titre fell to 1 : 2,000 at 2 hours and to practically nil at 6–7 hours. The urine showed a titre of 1 : 10,000 for urine voided up to 8 hours, dropping to 1 : 2,000 for the period 9–20 hours and to 1 : 20 for 33–45 hours. —A. W. STABLEFORTH.

IVÁNOVICS, G. (1940). Untersuchungen über das Polysaccharid der Milzbrandbazillen. **[Research on the Polysaccharide of the Anthrax Bacillus].**—*Z. Immun-Forsch.* **97.** 402–423. 6 tables. [Numerous refs.]

The author describes in detail a method for the separation of the polysaccharide of the anthrax bacillus in a high state of purity and free from substances derived from the agar medium. In the molecule of the polysaccharide are found in equimolecular proportions *d*-glucosamide and galactose, making together about 68% of the whole. The molecule also contains acetyl groupings which on hydrolysis yield acetic acid. Glycuronic acid and the pentose described by COMBIESCO *et al.* could not be detected. The polysaccharide could be isolated in equal amounts from the virulent and avirulent varieties of the same strain. Partially hydrolysed solutions of the polysaccharide behaved differently towards rabbit and horse sera containing the homologous antibodies.

Attention is drawn to the fact that *d*-glucosamine, galactose, and acetic acid have already been shown to be components of specific immune polysaccharide, *viz*, the group A specific substance in red blood cells, and the specific capsule substance of the type XIV pneumococcus.—A. W. STABLEFORTH.

IVÁNOVICS, G. (1940). Die Reaktion der spezifischen Substanz und des Antikörpers der Milzbrandbazillenkapsel. **[The Reaction of the Specific Substance and of the Antibody of the Anthrax Bacillus Capsule].**—*Z. ImmunForsch.* **97.** 443–459. 1 fig., 5 tables. [Numous refs.]

The author deals with the reaction between the specific capsular substance of the anthrax bacillus and its antibody. He finds that the largest amount of precipitate is obtained at a temperature of 0°C. Different preparations of the anthrax polypeptide although the same or closely similar in chemical composition can, when mixed with rabbit immune sera, give dissimilar amounts of precipitate. The specific capsular substance (or anthrax polypeptide) reacts with horse and rabbit sera in different ways, zone phenomena (optimal proportions) being much more marked with rabbit than with horse serum. It is impossible to assess the antibody content or protective value of rabbit and horse sera from their precipitation values. —A. W. STABLEFORTH.

LOVELL, R., & WHITE, E. G. (1940). **Naturally Occurring Tuberculosis in Dogs and Some Other Species of Animals. I. Tuberculosis in Dogs.**—*Brit. J. Tuberc.* **34.** 117–133. 2 tables, 1 appendix. [Numerous refs.]

During the years 1938–39, 25 out of 543 (4·6%) dogs autopsied were tuberculous. Of these, 22 were examined bacteriologically and 18 proved to be due to the human type and four due to bovine type tubercle bacilli. There appeared to be a higher incidence in males. Of the four cases due to the bovine type, the primary lesion was situated in the mesenteric or gastric lymph nodes of three, and probably in the alimentary tract in the fourth. In seven animals, all infected with the human type, the primary lesion was situated in the respiratory tract. Of the remaining cases, all due to the human type, five were probably alimentary in origin and six may have been either respiratory or alimentary, or represented primary infection in both sites. There was no difference between the tissue reactions to the two types of TB. Of the 22 cases, tuberculous pleuritis was present in nine and tuberculous peritonitis in seven; the mesenteric lymph nodes were affected in eight and the portal nodes in six animals. There were two cases of tuberculous pyelitis.

No giant cells were seen in sections, and tubercle bacilli were very scarce in smears. Calcified lesions were not seen, but basophile deposits, probably calcium, were found in the lesions in four cases.

Details of the autopsies, and histological and bacteriological examinations are given in the appendix.—GWILYM O. DAVIES.

KUWABARA, T. (1939). **Susceptibility of Cats to Tubercle Bacilli.**—*Kitasato Arch. exp. Med.* **16.** 275–284. 2 tables. [4 refs.] [In English].

These experiments were planned chiefly to determine the susceptibility of Japanese cats to infection with the human type of *Mycobac-*

terium tuberculosis. A series of cats were injected or fed with various strains of human type bacilli but when destroyed 1–3 months later, none showed macroscopic lesions. A few acid-fast bacilli were evident in the tissues of cats destroyed after 1–2 months, but none was found at autopsy after 3 months. About 30 cats were also kept in the homes of tuberculous patients for 2–3 years, but none showed evidence of infection P.M.

All cats given bovine type bacilli intravenously or orally showed evidence of progressive TB. It is stated that all the organs became infected except the mesenteric lymph nodes.—GWILYM O. DAVIES.

DANBOLT, N., & BRANDT, A. (1938). Sarkoidähnliche Hauttuberkulose, durch Hühnertuberkelbacillen hervorgerufen. **[Sarcoid-Like Skin Tuberculosis in Man caused by Avian Bacilli].**—*Arch. Derm., Berl.* **178.** 76–86. 6 figs. [11 refs.]

This is a detailed record of a case of chronic skin lesions in a woman which were diagnosed in 1934 as Boeck's sarcoid. The lesion had then been in existence for six years and had steadily increased in size in spite of periodical treatment with ultra-violet light and by cauterization. Two g. pigs, inoculated with material obtained at biopsy, showed no evidence of TB. when killed a year later.

In 1937 a further examination of the patient was carried out. Intradermal injection of avian tuberculin gave a positive reaction. Histological examination showed an appearance suggesting TB. or Boeck's sarcoid, the lesions being on the face, arm, and in the breast. Cultures were obtained from the face lesion on Petragnani's medium; g. pig inoculation was negative. Subcutaneous injection of the culture into a rabbit caused generalized TB. and the animal was killed *in extremis* at six weeks; a fowl similarly treated died from generalized TB. after ten weeks.

The authors have examined culturally six cases of true Boeck's sarcoid, but were unable to isolate avian tubercle bacilli; from 33 cases of lupus vulgaris the human type of tubercle bacillus alone was obtained.

Infection of poultry and pigs with avian tubercle bacilli is common in the part of Norway where the patient lived.—E. G. WHITE.

CARMICHAEL, J. (1940). **Pulmonary Tuberculosis in Uganda Natives. A Bacterial Survey.**—*Trans. R. Soc. trop. Med. Hyg.* **33.** 453–459. 1 table. [Numerous refs.]

C. carried out bacteriological examination of 283 samples of sputa received from officers of the medical department. The samples came from natives of eight named and other unnamed tribes, the customs of the tribes concerning cattle keeping being indicated. Five of them owned Ankole or Ankole cross cattle, which are known to be heavily infected with TB. [*V. B.* **10**, 649.], yet almost all the cases of TB. in the natives were of the human type. The bovine type of infection was found in only four samples of sputum.—J. E.

ALLAN, P. (1939). **The Tuberculosis Problem in the Union of South Africa.**—*S. Afr. med. J.* **13.** 740–742.

Although cattle and wild game in South Africa are affected with TB., infections of human beings with types other than the human do not, as far as is known, occur. The milk supply is certainly not free from tubercle bacilli, but no factors are known which inhibit human infection due to the bovine type of bacillus. The difficulty of obtaining material for bacteriological examination should, however, be taken into consideration.

GRIFFITH, A. S., & SMITH, J. (1940). **Types of Tubercle Bacilli in Pulmonary Tuberculosis in North-East Scotland.**—*Lancet.* **239.** 291–294. 2 tables. [4 refs.]

A survey of the types of tubercle bacilli occurring in 972 persons with pulmonary TB. in north-east Scotland has revealed 86% of cases from which eugonic human bacilli were cultivated, 37 cases of the dysgonic human variety, and 68 cases harbouring fully virulent bovine bacilli. It is pointed out that the proportion of bovine cases in the six north-eastern counties is unusually high (9·1%).

It is noted that of 49 country cases of bovine infection, 12 were in persons whose employment brought them into contact with cattle. Attention is also directed to 41 farmers or farm servants who were affected with pulmonary TB. of the human variety, and the liability of such cases to infect cattle or their milk is particularly stressed.—R. E. GLOVER.

GWAN, O. S. (1939). Essais de vaccination préventive ou curative contre la tuberculose expérimentale du cobaye. **[Trials of Preventive and Curative Vaccination against Experimental Tuberculosis in G. Pigs].**—*Z. ImmunForsch.* **96.** 334–

352. 14 tables. [7 refs.] [In French : German summary].

In numerous experiments on g. pigs it was determined by ordinary observation backed by statistical analysis, that the vaccine in question prolonged the duration of life in tuberculous animals, whether it was given before infection or simultaneously with it. The vaccine was composed of a heat-killed bovine strain mixed with a mixture of equal parts of vaseline and lanolin.—J. E.

DORIN, Elena. (1938). Contributiuni la studiul compozitiei chimice a bacillor acido-rezistenti (cenusa). **[On the Chemical Composition of Acid-Fast Bacilli].**—*Thesis, Bucarest.* pp. 70. 17 tables. [Numerous refs.] [Abst. from French summary].

The total ash per 100 g. dried bacterial bodies of various acid-fast tubercle bacilli grown on Sauton's medium lay between 2·7–5·75 g., and for certain paratuberculous organisms between 1·4–4·9 g. The ash of a bovine type was particularly rich in K, P, and S despite its comparatively poor growth on this medium. Paratuberculous organisms are richer in Mg (0·35–0·44%) than tubercle bacilli (0·18–0·27%); BCG type resembles the former in regard to this constituent. The dry matter of tubercle bacilli decreases with age with considerable corresponding reductions in N, S, P, and K, and especially in Mg and Fe. Tubercle bacilli of the strains employed could not develop in a medium deprived of S, P, Mg, or K; the effect of the absence of Fe was a diminution in total growth yield. The BCG bacillus was particularly sensitive to deficiencies of these elements.

Additions of small quantities of Mn, Al, and Zn were without appreciable effect on the development of tubercle bacilli, but chemical analysis showed that there was an increase in water content and a decrease in organic matter; the ash content of BCG and human type bacilli was unaltered, but was decidedly higher in the avian and bovine types. Al and Zn penetrated the bacillary substance but no Mn was found in the ash of any of the types studied. In the presence of increasing quantities of salts of K, Ca, Al, Mn, Zn, or As in Sauton's medium, tubercle bacilli developed normally even in concentrations up to 1·1% K_2HPO_4, 0·4% $CaCl_2$, 0·144% $Al_2(SO_4)_3$ and $ZnSO_4$, or 0·072% $MnSO_4$. Tolerance was greatest for K_2HPO_4, least for $MnSO_4$.

Arsenic salts (As_2O_5, sodium cacodylate and atoxyl) had a toxic action only when the concentrations were relatively large; atoxyl was the most toxic, reducing growths of paratuberculous organisms and avian types by half, in concentrations corresponding to 0·47 mg. % As. Other types withstood 100 times this concentration before the effects were apparent. With sodium cacodylate at 47 mg. % As levels, paratuberculous organisms were unaffected, while yields of tubercle bacilli were reduced by 50–75%.

Whatever salt was introduced into the medium there followed a decrease in organic matter and N contents of human, bovine, and BCG types, and an increase with the avian type. The addition of 0·4% $CaCl_2$ to the medium tended to lower the ash content of the various bacilli, the ash, however, being rich in Ca but much poorer in P. In the presence of 1·1% KH_2PO_4, BCG showed an increase of 1·4 g. % in its ash content and the bovine bacillus an increase of 0·86 g. %, but human and avian types were relatively little affected. Under the influence of 0·144% $Al(SO_4)_3$ and $ZnSO_4$, or of 0·072% $MnSO_4$ the mineral content of tubercle cultures rose, but the influence was not the same for all tubercle bacilli. Although the addition of Zn salts led to the presence of Zn in the ash of the tubercle bacilli, the proportion of the metal was not increased by increasing the amount of the salt added; in fact, the amount of Zn found in bacilli cultivated at a level of 0·009% $ZnSO_4$ in the medium, was higher than that grown on a medium containing 0·144%. Similarly the ash of bacilli grown on a medium containing 1·1% K_2HPO_4 was lower in K than in those grown on media rich in sulphates of Al, Mn, or Zn.—ALFRED EDEN.

CORPER, H. J. (1940). **Analysis of the Tubercle Bacillus and its Natural Products by Immune, Allergic, and Anaphylactic Tests.**—*J. infect. Dis.* **66.** 23–29. 7 tables, 1 chart. [9 refs.]

On Wong-Weinzial synthetic medium, a buffered mineral mixture using ammonium malate as nitrogen source and glycerol as carbon source, maximum growth of human tubercle bacilli occurred within 2–3 months. Liberation of tuberculo-protein into the medium occurred mainly after maximum growth was reached and continued for several months longer. Experiments were carried out with bacillary bodies of both virulent and avirulent

strains and with Seitz filtrate containing liberated tuberculo-protein, the former from cultures 3–4 weeks old and the latter from cultures 6–10 months old.

It was concluded that the bacillary body sensitizes primarily to tuberculo-allergy and serves to immunize against virulent infection while the natural filtrate containing tuberculo-protein sensitizes to anaphylaxis and provokes anaphylactic shock and allergic intoxication, but does not sensitize to allergy nor specifically immunize against infection.

Tuberculo-anaphylaxis, tuberculo-allergy and tuberculo-immunity are regarded as showing distinctive characteristics leading to the conclusion that they are separate biological phenomena not necessarily related.—H. H. G.

SMITHBURN, K. C., & LAVIN, G. I. (1939). **The Effects of Ultraviolet Radiation on Tubercle Bacilli.**—*Amer. Rev. Tuberc.* **39.** 782–793. 3 tables. [Num. refs.]

The effects were studied on the viability, staining properties, virulence, and immunizing power of human tubercle bacilli after exposure of saline suspensions to ultraviolet radiation (2,537 Å) at a constant distance of 15 cm. from the source of radiation. The results demonstrated that ultraviolet radiation can render tubercle bacilli non-virulent without being made non-viable and that irradiated viable bacilli may induce demonstrable immunity in experimental animals. Organisms killed by the radiation did not induce measurable immunity. Heavy suspensions (1 mg. per c.c.) required a period of 10 min. or more to be rendered non-viable, but less dense suspensions (0·05 mg. per c.c.) were apparently rendered non-viable by as little as one minute's exposure to the lamp. Organisms killed by radiation retained the property of acid-fastness.

A relatively long exposure was required to render heavy suspensions avirulent but weak suspensions containing only about 0·1 mg. of organisms per c.c. were quickly reduced in virulence, 15 seconds' exposure being adequate. Reduction in virulence could be demonstrated after less irradiation than was required to kill the organisms.—R. ALLCROFT.

WATANABE, Y., & MIZUGUCHI Y. (1939). **A Strain of Acid Fast Organism Resembling B.C.G., Isolated from Tuberculous Lung of a Dog.**—*Kitasato Arch. exp. Med.* **16.** 314–322. 6 tables. [In English].

A comparatively avirulent strain of TB. was isolated from the lung of a dog which showed several tubercles " the size of a small finger tip ". No lesions were present in the liver, spleen, stomach, or lymph nodes of the dog. Pathogenicity tests in g. pigs and rabbits suggested that it was a strain whose virulence was intermediate between the human and bovine types, and in no case did it give rise to progressive TB. Culturally the organism bore some resemblance to BCG.—G. O. DAVIES.

BLAUSTEIN, Jean B. (1939). **The Essential Substance Needed for the Growth of *Mycobacterium paratuberculosis*.**—*Thesis, Cornell.* pp. 46. 4 plates, 3 tables. [12 refs.]

An investigation to determine the lipoids that would support the growth of *Mycobact. johnei*, and the sources from which these could be isolated. Nine strains of the organism were used. Practically all the lipoids tested supported good growth of the organism. Growth differences on the various media were so slight that it was impossible to draw any conclusions as to the relative merits of the different lipoids. The following substances were found to support good growth of the usual piled-up type:– egg-lecithin, egg-cephalin, phlei-cephalin, phlei-acetone-soluble fraction, and intestinal mucous membrane lecithin. Phlei-lecithin was the only lipoid that supported the spreading type of growth. Whether this substance actually promoted a better growth than the other fractions, is a matter of interpretation.—HERBERT L. GILMAN.

BALOZET, L., & RECEVEUR, P. (1939). Contribution à l'étude des corynébactéries pyogènes. **[Contribution to the Study of Pyogenic Corynebacteria].**—*Arch. Inst. Pasteur Tunis.* **28.** 316–338. 7 tables. [13 refs.]

The authors consider that pus-forming diphtheroids can be divided into two main groups. The first group consists of *Corynebact. pseudotuberculosis ovis* and the second group consists of organisms which grow feebly if at all in ordinary media, the addition of hydrocarbons or proteins being necessary. A description is given of two strains belonging to the second group. One strain corresponded to *Corynebact. pyogenes*. The other strain was similar in many characteristics but it had certain distinct differences. Both strains were similar morphologically and they had the same

nutritive requirements. On the other hand the second strain grew feebly under anaerobic conditions, its proteolytic powers were poor, and it had no action on milk. It was not as haemolytic as the first organism, when tested by tube haemolysis. There was no serological relationship between the strains.

From the literature on the subject and further studies on similar strains obtained from other workers, the authors conclude that the second strain belongs to a distinct group of pyogenic diphtheroids. They suggest naming this second organism *Corynebact. pyogenes* and the first organism, which is proteolytic, *Corynebact. liquefaciens pyogenes bovis*. [This would be most confusing to English workers as by common consent the haemolytic proteolytic organism which acts on milk is called *Corynebact. pyogenes*.] Details of cultural and biochemical comparisons are given in the text. —D. L. HUGHES.

CRAIG, J. F., & DAVIES, G. O. (1940). **Corynebacterium equi in Bovine Pyometra.**—*Vet. J.* **96.** 417–419. [4 refs.]

In an outbreak of bovine sterility, organisms were isolated in pure culture from the uterine discharges of two cows with pyometra. These organisms in their morphological and cultural characteristics closely resembled *C. equi*, and are regarded as variants of this species. No trichomonads were found in the discharges. —R. FISHER.

RUSSO, E. (1939). Contribuição ao estudo fermentativo das bactérias do genero " Pasteurella ". **[Fermentation Studies with Cultures of Pasteurella].**—*Bol. vet. Exer. Brazil.* **6.** 127–135. 1 table. [14 refs.] [English summary].

R. studied fermentation reactions of 4 strains of *Past. pestis*, 9 of *Past. pseudotuberculosis rodentium*, 5 of *Past. aviseptica*, 4 of *Past. suiseptica*, 1 of *Past. boviseptica*, and 1 of *Past. lepiseptica*. Thirty-six substances were used for fermentation.

The following gave negative reactions :- amygdalin, *d*-arabinose, dextrin, dulcitol, erythritol, fucose, inositol, melezitose, raffinose, and sorbose.

By the other substances acid was produced but no gas. They may be divided into the following groups. 1. Indifferent substances, *i.e.* acid produced by all cultures, but with no differential value, *viz*, dextrose, galactose, inulin, laevulose, mannite, and mannose. 2. Substances producing acid with *Past. pestis* and *Past. pseudotuberculosis rodentium*, *viz*, arbutine, lactose, β-lactose, salicin, and aesculin. 3. Substances differential for *Past. pseudotuberculosis rodentium*, *viz*, rhamnose and melibiose. 4. Substances differential for *Past. septica* (from all sources) *viz*, sucrose.

Apart from these, some substances were found to be usually differential, *e.g.*, adonite was practically always fermented by *Past. pestis* and *Past. pseudotuberculosis*, but never by *Past. septica*. Maltose and trehalose were always acidified by *Past. pestis* and *Past. pseudotuberculosis* and only occasionally by *Past. septica*. Sorbitol is practically specific for *Past. septica* which only rarely fails to ferment it, whereas *Past. pestis* and *Past. pseudotuberculosis* never do. Glycogen was almost specific for *Past. pestis* which always fermented it. Arabinose, arabitol, cellose and xylose were acted upon so irregularly that they were of no differential value.—MILLER WATSON.

REIS, J. (1939). Duração da immunidade conferida por injecçoes simultaneas de " Pasteurella avicida " e sulphanilamida. **[Duration of Immunity Conferred by Simultaneous Injections of *Past. aviseptica* and of Sulphanilamide].**—*Arq. Inst. biol., S. Paulo.* **10.** 301–303. [2 refs.] [English summary].

R. immunized eight Leghorn chickens by the method described by CARDOSO, NOBREGA & REIS [*V. B.* **10.** 874.], and six months later inoculated them again with *P. aviseptica*, in doses which similar birds had tolerated 15 days after immunization by this method. The birds had not retained immunity and all died. Further investigations showed that the sulphanilamide : *P. aviseptica* immunization method may be dangerous as some birds prove to be carriers.—MILLER WATSON.

SHENG, T. (1938). Vergleichende Untersuchungen über das Pfeiffersche Influenzabakterium, das Schweineinfluenzabakterium und das Ferkelgrippebakterium. **[Comparative Examination of the Bacteria of Influenza of Human Beings, of Influenza of Adult Swine and of Piglet Influenza].**—*Inaug. Diss., Berlin.* pp. 26. 2 tables. [Numerous refs.]

S. studied many strains of *Haemophilus* organisms from the three types of influenza. They were all similar microscopically and in colony form (descriptive details given) so that

they could not be differentiated by these means.

Cultural tests on many media are described. All these organisms grew well aerobically and anaerobically on Levinthal's agar, chocolate agar, on agar + serum + haemoglobin (author's formula), on agar poured over a disk of raw potato or banana, and on agar to which had been added " potato water ", but the latter only allowed growth when obtained by at least six weeks of cold extraction, *i.e.* it contains both X and V factors [*V. B.* **8.** 672.] if sufficiently " aged ". The co-addition of haemoglobin caused a greatly increased growth. Agar + a culture filtrate of a haemolytic *Streptococcus* + haemoglobin also allowed good growth as did also agar + yeast extract + haemoglobin. The addition of vitamins B_1 and C to agar, alone or in combination, with or without haemoglobin, did not permit growth.

Attempts to differentiate the three organisms by fermentation tests were unsuccessful, but the human influenza organism produced indole while the others did not. Differentiation by serological methods was successful though there was a cross-reaction between all three at low titres.—J. E.

KAUFFMANN, F. (1939). Ueber verschiedene neue Salmonella-Typen. **[Various New Salmonella Types].**—*Acta path. microbiol. scand.* **16.** 347–358. 6 tables. [9 refs.] [In German].

Four new types of salmonella have been described and with their antigenic structure they are as follows :– *S. amager* III, X, XXVI : y : 1, 2; *S. zanzibar* III, X, XXVI : k : 1, 5; *S. shangani* III, X, XXVI : d : 1, 5; and *S. niloese* I, III, XIX : d, z_6.

Because of their O antigens they are all included in Kauffmann's group E and the latter two share with five other salmonellas, including the typhoid bacillus, the H factor " d ". All of these types possess different O antigens.

S. amager and *S. niloese* were isolated from the faeces of human cases of enteritis in Denmark. *S. zanzibar* and *S. shangani* were received from Zanzibar; the former was recovered from a clinically healthy typhoid carrier and the latter from a patient with fever and diarrhoea after abortion. None of the strains is pathogenic for mice by feeding experiments.

An examination has been made of the organism which was associated with abortion in a bitch and illness in man and named *S. abortus canis*. It is now regarded not as a new type of salmonella but as a variant of *S. paratyphi* B and possessing a third antigenic H phase, z_5.

The antigenic structure and biochemical reactions of *S. budapest*, *S. mikawashima*, *S. narashino*, *S. worthington*, *S. minnesota*, *S. carrau*, *S. kentucky*, and *S. onderstepoort* are reviewed and attention is drawn to their relationships.—R. LOVELL.

KAUFFMANN, F. (1940). Untersuchungen über S. abortus bovis, S. Schleissheim sowie zwei neue Salmonella-Typen S. abony und S. tel-aviv. **[Examination of *Salmonella bovis* and *S. schleissheim* and Two New Types, *S. tel-aviv* (in Chickens) and *S. abony*].**—*Acta path. microbiol. scand.* **17.** 1–8. 3 tables. [4 refs.] [In German].

K. records his examinations of several strains of different types of salmonella and points out the relationship they have one to another. The strains of *S. abortus bovis* were from bovines except for one strain which had been recovered from the faeces of a healthy man who carried in addition another salmonella which proved to be a fresh type, *S. abony*. The strains of *S. schleissheim* were from bovines, minced meat, and the faeces of human beings who had suffered from a gastro-enteritis. The biochemical reactions of these three types are given and it is of interest to note that both *S. abortus bovis* and *S. schleissheim* liquefy gelatin, which is unusual in salmonellas. All three types have much in common as regards their antigenic structure, and share with *S. paratyphi* B certain H and O factors. The antigenic structure is as follows :– *S. abony* I, IV, V : b : e, n, x; *S. abortus bovis* I, IV, XXVII : b : e, n, x; and *S. schleissheim* IV, XXVII : b, z_{12}.

A new salmonella *S. tel-aviv* is also described. It appears to have been responsible for an epidemic in chickens with a mortality of 50 %. The antigenic structure is :– XXVIII : y : e, n. —R. LOVELL.

SCHMIDT, J., & MEYN, A. (1940). Ueber eine Breslau-Erkrankung bei Pferden. **[*Salmonella typhi-murium* Infection in Horses].**—*Berl. Münch. tierärztl. Wschr.* April 12th. 171–173. [6 refs.]

After a four-day journey by rail five aged horses became affected with high fever, gastro-enteritis, and diarrhoea, four of them dying after a short illness. Attempts to isolate a causal organism from the blood and faeces

during life failed but *S. typhi-murium* was recovered P.M. from the organs. One horse was observed carefully for five days before death and the observations are recorded. The blood serum of this horse agglutinated *S. typhi-murium* to 1 : 200.

Some observers have divided *S. typhi-murium* into four groups mainly on certain biochemical reactions such as the speed of the reaction with rhamnose and the ability to use ammonia. The habitat of some of these sub-groups is probably limited but the strain from the horses belonged to what has been called the " full " type and has an ubiquitous distribution. The question of its possible presence in healthy horses is raised.—R. Lovell.

Lutje, F. (1940). Blutuntersuchungen bei Rindern auf Gärtnerinfektion und Dauerausscheiderfragen. **[Blood Tests on Cattle for Salmonella Infection, with Reference to Continuous Excretion].**—*Berl. Münch. tierärztl. Wschr.* March 29th. 145–148. 2 tables. [9 refs.]

In order to effect some control over cattle which are carriers of *S. enteritidis* or the Dublin variant, it was decided to examine the blood sera of animals for specific agglutinins. Little detail is given concerning the type of suspension used or the method employed, but the critical titre appears to have been 1 : 100. Altogether 20,698 samples of sera were examined and of these 15 were thought to be positive and *S. enteritidis* was isolated from the faeces of 5 of these cattle. Tetrathionate broth is recommended for the isolation of the organisms from faeces and brilliant green : phenol red agar proved a good substitute for malachite green medium. [It is of interest to note that the carrier cow in the Wilton outbreak of *S. enteritidis* var. *dublin* infection was detected first by serological means, see Conybeare & Thornton (*V. B.* **8.** 657.)]—R. Lovell.

Edwards, P. R., Bruner, D. W., & Rubin, H. L. (1940). **A New *Salmonella* Type Isolated from Apparently Normal Hogs.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 395–397. [4 refs.]

Strains of *Salmonella* are stated to have been isolated frequently from the mesenteric lymph nodes removed at slaughter from apparently normal pigs by one of the authors (R.); these data are as yet unpublished. Saline extracts of the lymph nodes were incubated overnight in Kauffmann's tetrathionate medium, which was transferred next day to brilliant-green agar plates. In one instance, three types of *Salmonella* produced colonies on the brilliant green agar plates; two were identified as *S. derby* and *S. bareilly*, while the third was found to be a hitherto unrecognized organism. The somatic antigens of the new organism were found to be III, X, and XVI, thus placing it in Group E of the Kauffmann-White classification. Examination of the flagellar antigens showed that the organism was diphasic. The antigens of the specific and non-specific phases were determined, the final antigenic formula being given as :– III, X, XVI : z_{10} : 1, 5. The name *S. lexington* is proposed for the new organism.—Alastair N. Worden.

Edwards, P. R., & Bruner, D. W. (1939). **The Demonstration of Phase Variation in Salmonella abortus-equi.**—*J. Bact.* **38.** 63–72. 2 tables. [12 refs.]

The flagellar antigens of some salmonellas may exist in either of two phases—the diphasic phenomenon of Andrewes. Certain so-called monophasic strains may exhibit an α-β phase variation and the custom now is to refer to both phenomena as phase variations 1 and 2.

S. abortus-equi has been described as possessing flagellar antigens enx, which are present in some organisms as phase two, known previously as the β phase. It was suggested that the α phase was suppressed. An examination of 24 strains has shown that some strains exhibit this phase variation and the separation of the phases has been accomplished by a modified Wassen technique. Semi-solid agar was prepared and immune serum containing agglutinins against antigens enx added. Outgrowths from the original stab culture represented the masked phases. Actually two phases were unmasked by this procedure and they are known as phases 1 and 3; phase 2 is the original enx. Phase 1 is similar to the normal antigens of *S. paratyphi A* (a), phase 2 is the form in which the organism normally occurs (enx), whilst phase 3 is related to but not identical with the β phase of the Schleissheim type (z_5). The phases are reversible and it is the first time that more than two phases have been demonstrated in a *Salmonella*.—R. Lovell.

Kasai, K., & Hirato, K. (1940). **Experimental Studies on Infectious Abortion in Mares. VII. Preventive Vaccination with Live Cultures of *Salmonella abortus-equi*.**—*Jap. J. vet. Sci.* **2.** 1–22. 4 tables,

2 charts. [11 refs.] [In Japanese: abst. from English summary]. [For previous parts, see *V. B.* **9.** 754].

NISI, T. (1940). **Experimental Studies on Infectious Abortion in Mares. VIII. Studies on Haemolytic Streptococci Appearing in the Vaginas of Pregnant and Non-Pregnant Mares Inoculated with *Salmonella abortus-equi*.**—*Ibid.* 23–38. 8 tables. [Numerous refs.] [In Japanese: abst. from English summary].

VII. Six experiments were conducted. Following vaccination there was a rise in temperature which returned to normal in 5–6 days; this was accompanied by changes in the blood picture. Salmonella were recovered from the blood 24–48 hours after vaccination. After revaccination they disappeared from the circulating blood more quickly than after initial vaccination. Vaccinated animals, together with untreated pregnant mares and mares which had previously aborted, were submitted to test injections of salmonella given intravenously. The results of these experiments suggest that an appreciable immunity to infectious abortion was induced.

VIII. The vaginas of 17 pregnant mares (ten of which had aborted), of 5 non-pregnant mares which had been inoculated with *S. abortus equi*, of 12 normally delivered mares, and of 87 normal cases of early pregnancy were examined for haemolytic streptococci. Large numbers of haemolytic streptococci were continuously detected in the vaginas of nearly all inoculated mares, whereas no streptococci could be recovered from the great majority of non-infected mares. Most of the strains isolated belonged to the type A streptococcus group.—R. FISHER.

FIENNES, R. N. T.-W. (1940). **A Note on a Dysentery-Like Organism Isolated from the Intestinal Contents of a Calf.**—*E. Afr. med. J.* **17.** 122–124. [1 ref.]

From the intestinal contents of a calf which had died there was isolated a Gram-negative non-motile bacterium which had some resemblance to the dysentery group. It formed acid but not gas from glucose and maltose, but failed to produce acid in several other kinds of sugar media. Faint acidity was observed with saccharose and inosite after 72 hours. It was moderately pathogenic for calves but not for rabbits, and the filtrates of eight-day broth cultures were moderately toxic for rabbits. It was not associated serologically with several of the human dysentery bacilli.—R. LOVELL.

STONE, W. S. (1940). **Brucellosis in Horses and Goats in New York State.**—*Thesis, Cornell.* pp. 77. 19 tables. [Num. refs.]

The agglutination test for brucella infection was applied to 1,741 horses in New York state. The animals were classified in three groups, *viz*, country, city, and clinic horses. The city (New York) horses had the smallest number of reactors, and the clinic horses the highest. Approximately 65% of the city horses, 53% of the country horses, and 44% of the clinic horses were negative at 1 : 25.

Br. abortus was frequently isolated from unopened fistulous withers or poll evil abscesses. Of the 112 cases, 20% were negative to the aggln. test at 1 : 25. A negative prozone was frequently observed. Brucella were not recovered from the fresh faeces of several of the reacting horses.

Several goat herds were examined, and 419 samples of goats' blood tested for brucella infection. Only 23 of those tested showed any agglutinins at 1 : 25. No goat showed a titre as high as 1 : 100. Brucella were not recovered either in the milk or body tissues of any New York State goats.—HERBERT L. GILMAN.

VELLISTO, E. (1940). Das Problem der Ausscheidung der Bang-Bakterien mit der Milch. [**The Problem of Udder Excretion of *Brucella abortus***].—*Arch. wiss. prakt. Tierheilk.* **75.** 276–282. [16 refs.]

V. discusses the various methods of diagnosing udder infection with *Br. abortus*. He concludes that milk or whey agglutination tests provide a reliable and sensitive method, but that in order to be assured that no excretion is occurring or likely to occur it is necessary to take a titre of 1 : 2·5 as positive (*i.e.* with a suspension containing "not less than 400–500 million organisms per c.c."). In milk samples with such a titre brucella can only rarely be detected by cultural methods or g. pig inoculation. Tests at such low dilutions, however, are likely to be interfered with by nonspecific sedimentation particularly in summer samples or those from newly calved or drying cows.—A. W. STABLEFORTH.

SUNDERVILLE, E. J. (1940). **The Persistence of U. S. B. A. I. Brucella Strain 19 in Vaccinated Calves.**—*Thesis, Cornell.* pp. 33. [20 refs.]

A record of experiments conducted on six calves 4–6 months old, to determine whether and for how long a vaccine prepared from strain 19 of low virulence would persist in their bodies when injected subcutaneously, and whether any change in virulence could be detected as a result of the retention of the organism in the calves.

All six calves were negative to the agglutination test at the start of the experiment. Each animal received one dose of 5 c.c. of the vaccine subcutaneously. Strain 19 became localized in the non-pregnant genital tract of one calf, and was recovered 156 days after inoculation. A titre of partial aggln. at 1 : 50 was found to be associated with infection in one calf. Haemocultures were positive for *Br. abortus* from three calves 17 days after vaccination, but all cultures made on the 28th day, and on autopsy, were negative. G. pig inoculations were more accurate than cultures as a means for recovering the organism. Strain 19 showed no apparent change in virulence as the result of passage through these calves.—Herbert L. Gilman.

Dubois, C., & Sollier, N. (1939). Inefficacité de la legislation sanitaire contre la brucellose et necessité de la vaccination préventive de l'homme en milieu infecté. **[Inefficiency of Sanitary Legislation against Brucellosis and Necessity For Preventive Vaccination of Man in Infected Areas (France)].**—*Bull. Acad. Méd. Paris.* **121.** 256–261. [Num. refs.]

Attention is drawn to the inefficiency of sanitary legislation dealing with brucellosis in France, and to the consequent danger of increase in the infection rate of human beings. The authors hold the opinion that preventive vaccination of animals should be carried out, and they refer to promising results which, in their opinion, were obtained by the use of a vaccine prepared by them from living, avirulent *Brucella suis*. As it is practically impossible for suitable hygienic measures to be adopted by all persons who come into contact with infected animals or their products, vaccination of human beings in infected areas is advocated, and in this connexion the authors describe trials made by them with a vaccine prepared from human, caprine, and ovine strains of *Br. melitensis* and from *Br. abortus* and *Br. suis*.

Saiki, S., & Onmyoji, M. (1939). **The First Epidemic of Human Brucellose and its Spread in Manchuria.**—*J. orient. Med.* **30.** 182–188 of European abstrs. [In English].

Saiki, S., Onmyoji, M., & Tsukamoto, K. (1939). **Three Cases of the First Recognized Human Undulant Fever in Manchuria.**—*Ibid.* 707–720. 3 charts. [In Japanese: abst. from English summary p. 184].

I. Several cases of human infection are reported. In 1936 an epidemic broke out in a goat-raising district, serological and bacterial examination of the 29 cases showing the presence of *Brucella melitensis*. As the patients never take raw dairy products they are believed to have become infected directly by handling infected goats. In various other districts employees in cattle- and goat-raising yards, where infection has been detected among the animals, have contracted the disease.

II. A detailed description of three cases occurring in the epidemic referred to in I.

Vallée, M. (1940). Sur les gangrènes gazeuses des bovidés et sur leur prévention. **[Gas Gangrene of Cattle and its Prevention].**—*C. R. Soc. Biol. Paris.* **133.** 51–52. [4 refs.]

Out of 39 cases (many of them deemed atypical of *Clostridium chauvoei* infection) in widely scattered regions of France, V. found gas gangrene of cattle to be due to *Vibrion septique* 11 times, *Cl. welchii* 3 times, *Cl. oedematiens* once, *Cl. chauvoei* with *Cl. welchii* twice, *Cl. chauvoei* with *V. septique* 7 times and *Cl. chauvoei* alone 15 times. He prepared a quadrivalent vaccinal anaculture of all four types of bacteria by mixing equal quantities of each antigen, using it as a single injection of 20 c.c. This was used upon 16,508 animals. Under the very variable conditions there were no bad sequelae and the method was efficient according to all indirect methods of judgment, all vaccinated animals remaining healthy, whereas gas gangrene occurred in the same areas in untreated animals.—C. V. Watkins.

Rodrigues, C. (1939). Estudos sobre a "manqueira". Etiologia—diagnostico. **[Studies in Blackleg].**—*Arq. Inst. biol., S. Paulo.* **10.** 1–30. 8 tables. [Numerous refs.] [English summary].

R. studied material from 44 bovine cases of blackleg. In 31 cases *Clostridium chauvoei* was isolated from muscle and/or bone marrow. In 21 cases the organism was found alone and in 10 cases it was associated with *Cl. septique* and

Cl. welchii. In 51 cases *Cl. septique* and *Cl. welchii* were found without *Cl. chauvoei*. Having examined the conditions under which the material was collected and delivered R. concludes that *Cl. chauvoei* is the causal agent of blackleg in São Paulo.

He considers that the best method for the cultivation of *Cl. chauvoei* consists of enrichment of the non-heated material in Tarozzi's broth, inoculation of the 24 hours' culture into g. pigs, and cultivation of material from the g. pigs by Fortner's technique. *Cl. chauvoei* was found when the material was received within seven days of death, but after ten days had elapsed the organism could not be isolated. —MILLER WATSON.

RAMON, G., & LEMETAYER, E. (1939). Données nouvelles sur la valeur et la durée de l'immunité conférée par l'anatoxine tétanique; conséquences théoriques et pratiques. **[The Duration of the Immunity Conferred by Tetanus Anatoxin].**—*C. R. Acad. Sci., Paris.* **209.** 704–707. [3 refs.]

The authors tested the immunity of 126 horses, vaccinated between 1929–37. Vaccination was by two injections at an interval of one month, each of 10 c.c. of tetanus anatoxin in tapioca. A third inoculation of 10 c.c. was given, usually one year afterwards. The immunity conferred was found to be remarkably solid and constant, the antitoxic power of the blood being at least 1 : 100 in 93% of the animals, often reaching 1 : 3 or higher and never being lower than 1 : 300. The degree of immunity shown by horses vaccinated 8–10 years before was similar to that of animals vaccinated only 2–3 years previously. As a titre of 1 : 1,000 ensures resistance to a lethal dose of tetanus spores, the extent of immunity acquired by these horses may be easily judged.

The superiority of active immunization with tetanus anatoxin over passive immunization with antiserum is stressed. Between 1925–29, out of 13,000 horses treated with antiserum only, there were 50 cases and 30 deaths. In the same area, containing 16,500 horses, from 1932–37 when systematic vaccination with anatoxin was practised there were no cases of tetanus among the vaccinated animals. Attention is drawn to the application of these principles to the immunization of human beings.

WALBUM, L. E., & REYMANN, G. C. (1939). **The Production of Toxin by *Bacillus sordellii* (*Cl. sordellii*) in Comparison with other Clostridia.**—*J. Path. Bact.* **49.** 185–194. 2 figs., 12 tables. [12 refs.] [Extract from authors' summary copied *verbatim*].

1. The production of toxin was largest in peptone broth without the addition of glucose. *Coli*-fermented broth was a less suitable medium. 2. Additions of peptone exceeding about 1–2 per cent. appeared to impair toxin production. In broth containing pieces of meat, toxin production was less than in ordinary peptone broth. Witte peptone has proved to be particularly suitable. 3. *Sordellii* toxin has its maximum point of stability in the neighbourhood of *p*H 6·0. 4. The optimum reaction for the albuminose-digesting enzyme lies around *p*H 7·0. 5. The gelatin-liquefying enzyme has its action optimum at about *p*H 6·5.

DUMOFF, M. (1939). **The Influence of Numbers on the Resistance of Bacterial Spores to Heat.**—*Thesis, Cornell.* pp. 37. 14 tables. [Numerous refs.]

Experiments to determine the influence of numbers on the resistance of bacterial spores to heat. No definite conclusions are drawn. In some instances, a definite correlation was observed between the concentration of the spore suspension and its heat resistance. Results were not consistent. It would seem that some unknown factor or factors operated to cause the great variation noticed in these experiments.—HERBERT L. GILMAN.

FROST, Bettina M. (1940). **A Study of the Actinomyces in the Mouths of Normal Cattle.**—*Thesis, Cornell.* pp. 21. 1 table. [14 refs.]

Bacteriological studies to determine if *A. bovis* could be recovered from the mouths of normal cattle. An actinomycete that grew both anaerobically and aerobically was recovered from the mouths of 20 out of 35 apparently normal cattle. The organism differs from *A. bovis* only in carbohydrate fermentation. Intramuscular injection of two heifers with the organism failed to result in the production of lesions after a period of 2½ months.—H. L. G.

I. SULLIVAN, E. R., & DIENES, L. (1939). **Pneumonia in White Mice Produced by a Pleuro-Pneumonia-Like Micro-Organism.**—*Proc. Soc. exp. Biol., N.Y.* **41.** 620–622. [6 refs.]

II. KLIENEBERGER, Emmy. (1940). **The**

Pleuropneumonia-Like Organisms: Further Comparative Studies and a Descriptive Account of Recently Discovered Types.—*J. Hyg., Camb.* **40.** 204–222. 20 figs. on 4 plates, 8 tables. [Numerous refs.]

III. KLIENEBERGER, Emmy, & STEABBEN, Dorothy B. (1940). **On the Association of the Pleuropneumonia-Like Organism L3 with Bronchiectatic Lesions in Rats.**—*Ibid.* 223–227. 6 figs. on 1 plate, 2 tables. [10 refs.]

IV. EDWARD, D. G. ff. (1940). **The Occurrence in Normal Mice of Pleuro-Pneumonia-Like Organisms Capable of Producing Pneumonia.**—*J. Path. Bact.* **50.** 409–418. 4 figs. on 1 plate. [20 refs.]

I. The isolation is described of a pleuropneumonia-like micro-organism from the lungs of mice during serial intranasal mouse passage of material from rheumatic fever or arthritis in human beings. Favourable culture media are given. The agent was considered to be derived from mice, since a strain was obtained by blind passage of mouse lungs and since direct culture from human material was invariably negative.

II. An account is given of a pleuropneumonia-like micro-organism isolated from neck abscesses in g. pigs and very similar to the L1 strains isolated from *Streptobacillus moniliformis* cultures. Colonial, morphological, and serological differences are described in three rat and three mouse strains of the pleuropneumonia group and a study is made of saprophytic members of the group antigenically unrelated to the parasitic types.

III. Close relationship is demonstrated between the pleuro-pneumonia-like micro-organism L3 and bronchiectasis in rats, although the lesions have not so far been reproduced by nasal instillation of the L3 strain, the cultural and serological features of which are described.

IV. The isolation of five strains of pleuropneumonia-like organisms from normal and experimental mice is described. Intranasal instillation of cultures of these organisms into mice was shown to cause pneumonia in a large percentage, while intraperitoneal injection produced lesions in the lungs and liver. Details of cultural characters, resistance, ultrafiltration, and pathogenicity are given, with a description of the lesions produced.—R. O. MUIR.

DISEASES CAUSED BY PROTOZOAN PARASITES

LESTER, H. M. O. (1939). **Certain Aspects of Trypanosomiasis in Some African Dependencies.**—*Trans. R. Soc. trop. Med. Hyg.* **33.** 11–36.

A survey is given of the methods adopted for the control of sleeping sickness in Tanganyika, Uganda, Nigeria and the Sudan. It is considered that the occurrence of a few cases of sleeping sickness should not be considered as a calamity, and provided that there is adequate contact between medical staff and the population, there is no fear of the wholesale devastation which occurred formerly. Control measures should not interfere with general development, as the movement and settlement of the population in restricted areas may lead to soil exhaustion and erosion, with consequent malnutrition and resulting damage greater than that of the disease.

In Tanganyika the position is somewhat different as the disease is transmitted by *Glossina morsitans* and *G. swynnertoni* and in some areas fly extension has been occurring. The advance of tsetse flies is really a cattle problem. The scattered population at the edge of a fly belt is not sufficiently numerous for their farming activities to drive back the tsetse. Cattle become infected and die of trypanosomiasis, the people move, the bush grows up and flies occupy the abandoned area.

Attempts made to prevent tsetse advance by barrier clearings were too late and have been abandoned. Some success is being obtained by the exclusion of grass burning. The concentration of population has not been entirely successful as it has led to overcrowding and impoverishment and erosion of soil, and island settlements rather than large concentrations are now being advocated. It has been found that each family requires about 16 acres of land for cultivation and extension.

A complaint is made that little has been done to encourage agricultural development in these settlements, and it is suggested that, as the problem is one mainly affecting cattle, funds for tsetse research should be obtained by a cattle tax which would have the effect of making owners utilize their cattle to the full, and sell off those animals which are not paying their way economically.—U. F. RICHARDSON.

PENSO, G. (1938). I fenomeni immunitare nelle tripanosomiasi. **[Immunity Phenomena in Trypanosomiasis].**—*R. C. Ist. sanit. pubbl., Roma.* **1.** 981–1078. [Numerous refs.]

This carefully compiled monograph which refers to over 450 publications should be of great value to those interested in the host reaction to trypanosome infections, and the value of such reactions as methods of diagnosis.

From this study of the literature it is concluded that trypanosomes probably produce toxins, but that proof of this is not satisfactory. Although agglutinins are produced it appears that agglutination has only a group specificity, and that the blood of some healthy mammalian hosts will also agglutinate trypanosomes. It is suggested that a greater specificity might be obtainable by tests of the saturation of agglutinins. The various authors are not in agreement about the production of precipitins, and there is no evidence that thermo-precipitins occur. SICÉ has claimed that in human trypanosomiasis, flocculation occurs on mixing infected serum with an alcohol-acetone extract of the heart of a sheep infected with either *T. congolense* or *T. brucei*, whilst BENNETT and KENNY's mercuric chloride flocculation appears to be a reliable test for surra in camels, although laboratory workers have not been able to confirm its specific value. It is suggested that a further study of these two flocculation tests may be of value.

It appears that *in vitro* sera of animals recovered from trypanosomiasis have a lytic action on the homologous trypanosomes, and it has been assumed that trypanolysins occur *in vivo*, and that the periodic disappearance of trypanosomes from the peripheral blood is due to their action. Some authorities do not accept this assumption and explain the periodic freedom of the peripheral blood as due to the development cycle of the parasites which require a stage in the internal organs of the host for biological and biogenetical regeneration.

There has been much difference of opinion between workers as to the value of complement-fixation tests, some being unable to obtain positive results whilst others claim the test to be 100% accurate. The reaction will not differentiate between members of the genus *Trypanosoma*, and is therefore only of value if only one species is present. [This is probably incorrect: complement fixation is common only to trypanosomes of the same group.]

Considerable difference of opinion exists as to the phagocytic reaction. Some authorities ascribe destruction of trypanosomes to lysins and others claim that phagocytosis is the only defence mechanism. It has been shown that leucocytes, the erythrocytes of primates, and platelets adhere to trypanosomes which are exposed to immune sera, and that all these adhesion phenomena are similar in that they require the presence of complement and are highly specific. The cellular elements in all three reactions can be replaced by colloidal particles.

There is insufficient evidence to justify a conclusion as to whether anaphylaxis occurs, and although allergic reactions have been described, their authenticity is doubtful.

Passive immunity can be conferred by immune sera, but only to the extent that such sera are protective and not curative. This protective property is short lived, and is said to be so specific that antiserum to an original strain will not protect against a relapse strain. A protective property analogous to antiserum also occurs in human serum and in this case there is also a curative action. Some workers claim that this property is a quality of complement or some analogous substance, and others suggest that human serum is not trypanocidal, but has a trypanocidogenic action. Whatever its nature, the property appears to be contained in the globulin fraction of the serum, and is thermolabile.

Natural recovery from a trypanosome infection leaves an active specific immunity to reinfection and this fact has suggested the use of vaccines in immunization. Trypanosomes killed in various ways have been used, and live organisms given by the mouth, injected into the spleen, or inoculated into young animals have been tried. Success has been claimed for all these methods, but attempts to confirm their value have usually failed; the last method based on an attempt to produce premunity could not be used in practice as it creates carrier animals. [This would be no objection in a "fly belt" where carrier game is present in any case.]

Research on the protein variation in blood of animals infected with trypanosomes is so discordant that no conclusions can be drawn, but there appears to be a fall in blood sugar which is most marked in the terminal period. That a physico-chemical change occurs is also shown by the formol-gel test and by the

formol-stibosan reaction, but these are not considered to be specific to trypanosomiasis. —U. F. RICHARDSON.

ROSS, F. U. (1938). La durina. **[Dourine in Mexico].**—*Rev. mex. Med. vet.* **2.** No. 13. 28–31.

Outbreaks of dourine have occurred recently in the Durango and Chihuahua districts of Mexico, and R. gives an account of the disease and the measures which have been adopted to control it. A census is to be made of all equines in the affected areas, to be followed by an examination which will include agglutination and complement-fixation tests. Affected animals are to be slaughtered and cremated or buried, and contaminated stalls and equipment are to be disinfected.—U. F. RICHARDSON.

GIOVANNOLA, A. (1938). Il Plasmodium gallinaceum Brumpt, i corpi toxoplasma-simili ed alcune inclusioni di probabile natura parassitaria nei globuli bianchi del Gallus gallus. **[*P. gallinaceum* Brumpt, *Toxoplasma*-like Bodies and other Inclusions in the Leucocytes of Fowls].**—*R. C. Ist. sanit. pubbl., Roma.* **1.** 518–531. 45 figs. on 3 plates, 1 table, 2 graphs. [Numerous refs.] [Also appeared in *Riv. Parassit.* **2.** 129-142. (1938)].

Observations were made on the parasitic forms appearing in the blood of fowls infected with a strain of *P. gallinaceum* received from BRUMPT and maintained by subinoculation through fowls. Descriptions and excellent illustrations are given of the young and adult sporozoites, and of the schizonts and gametocytes, the last of which displace the nucleus of infected erythrocytes. Schizonts usually contain 24 merozoites, and the asexual cycle was shown to be completed in 36 hours, and to be fairly regular, as 91% of forms present at any one time are in the same stage of development.

Toxoplasma-like bodies appeared irregularly in the birds under observation. They were found in the cells of the capillaries of the brain, liver, and lungs, and also within leucocytes of the peripheral blood, and were devoid of pigment. The difference between these bodies and the plasmodia may indicate that they belong to another parasitic species, or may be due to their development in a different type of host cell.

Inclusion bodies similar to *Rickettsia* are also described in the endothelial cells. These were often very numerous in the peripheral blood during the night. Other bodies occurred in the red cells, and sometimes free in the plasma, and it is suggested that these might belong to the *Grahamella-Eperythrozoon* type of organism.—U. F. RICHARDSON.

LUMSDEN, W. H. R., & BERTRAM, D. S. (1940). **Observations on the Biology of *Plasmodium gallinaceum*, Brumpt, 1935, in the Domestic Fowl, with Special Reference to the Production of Gametocytes and their Development in *Aëdes aegypti* (L.).**—*Ann. trop. Med. Parasit.* **34.** 135–160. 6 figs., 5 tables. [Numerous refs.]

In observations on *P. gallinaceum* infections in young fowls the prepatent period after intravenous inoculation of infected blood was found to vary from 2–9 days, appearing to increase as the number of parasites injected decreased. The mean prepatent period after intramuscular injection was $6{\cdot}41 \pm 0{\cdot}34$ days. After mosquito infection the prepatent period was very uniform, varying from 8–11 days. The conclusion of GIOVANNOLA [see preceding abst.] that the periodicity of *P. gallinaceum* is 36 hours, with maximum schizogony occurring alternately at midday and midnight, was confirmed, and it is suggested that such a periodicity cannot depend on periodic variation in the physiological processes of the host.

The periods of maximum schizogony occur at definite times after infection by mosquitoes, but in inoculated fowls no such regularity is noticed. Gametocytes appear in the peripheral circulation as soon as do asexual forms, and the percentage of these forms rises at about the same rate as the percentage infection rate of erythrocytes with schizonts. It is suggested that gametocytes are produced in broods, which reach maturity in about 24 hours after schizogony. The percentage of gametocytes is always low, 1–2%, but tends to rise towards the end of infections progressing towards recovery. Fowls are infective to *Aëdes aegypti* from the beginning of the apparent infection, the highest average count of oocysts tending to precede the highest gametocyte count per unit volume of blood.

It is noted that four fowls, under 12 weeks old at the time of infection, died with massive blood infections of over 1,000 parasites per 1,000 erythrocytes, whilst of 14 fowls over 12 weeks old only one died.—U. F. RICHARDSON.

VELÁSQUEZ, J. G. (1938). Contribución al estudio de las piroplasmosis de los

animales domesticos en Colombia. **[Piroplasmosis of Domestic Animals in Colombia].**—*Rev. Med. vet., Bogotá.* **8.** 67–108. 10 figs. on 3 plates. [Numerous refs.]

The history of piroplasms is briefly discussed, and a classification is given agreeing with that proposed by MESNIL in which the babesia are divided into large forms, *Piroplasma*, and small forms, *Babesiella*. *B. gibsoni* is described as belonging to the genus *Achromaticus*, although that genus is defined as consisting of organisms of a large size [*B. gibsoni* is minute.] Theileria are said to divide into two or four daughter individuals within the red corpuscles. [It is commonly accepted that the intra-erythrocyte forms of theileria do not multiply within the corpuscles.] The following species of piroplasms and anaplasms are recognized as occurring in Colombia :– *B. bigemina*, *B. argentina*, *B. major*, and *Anaplasma marginale* in cattle, *B. caballi* and *B. equi* in horses, and *Rangelia vitalii* in dogs.

No new information is given as regards *B. bigemina* and equine piroplasmosis, though it is noted that nuttalliasis yields to treatment with akiron [acaprin], a dose of 1·2 g. per 100 kg. body weight being recommended.

B. argentina is said to cause fever and congestion of the visible mucous membranes. Haemoglobinuria commences about the third day of disease, and anaemia develops in the later stages. In addition to splenic hypertrophy and myocarditis, an intense congestion of the kidneys occurs, so that it is impossible to differentiate the cortex and medulla. Parasites are rare in the peripheral blood though they may be detected microscopically in the early stage of the disease. The mortality varies from 80–100%, but acriflavine cures, a dose of 50 c.c. of a 2% solution being recommended.

B. major is thought to have been only recently introduced. Parasites are very numerous in the blood, and the disease caused resembles that due to *B. argentina*, but is not as acute. Jaundice is less marked, and haemoglobinuria less severe, but anaemia is more intense. Pronounced congestion of the kidneys does not occur. Mortality varies from 60–100% but this disease also yields to treatment with acriflavine.

The mortality in anaplasmosis varies with the class of stock attacked, but may be high in adults and imported animals. Cacodylate of soda has been recommended for treatment in Brazil, but neosalvarsan, in doses of 8 g. for an adult, is considered better in Colombia.

In dogs *Rangelia vitalii* is said to be rare in the peripheral blood and may not be demonstrable in the later stages of disease. The intracorpuscular forms may be round, oval, or pear-shaped, and vary in diameter from 2–4·5 μ. Multiplication is by binary fission, the nucleus dividing before the cytoplasm, and the two halves proceeding to opposite poles of the organism. Up to eight parasites may occur in one blood corpuscle. A form of schizogony occurs in the endothelial cells of various internal organs, lungs, kidneys, heart, and brain, and 50 or more organisms may be found clustered together. Infection is transmissible by blood inoculation. Cases may be acute, with great depression, intense anaemia, and jaundice; in subacute cases, there is jaundice, cutaneous haemorrhage and hypertrophy of superficial lymph nodes; in chronic cases there is debility and anaemia. The transmitting ticks in Brazil are *Amblyomma cayennense* or *A. striatum*, but it is suggested that *Rhipicephalus sanguineus* may also act as a transmitter. For treatment, alternating injections of trypanblue and neosalvarsan are recommended. Illustrations of this organism are given.—U. F. RICHARDSON.

LANDSBERG, J. W., & ESKRIDGE, L. C. (1940). **The Erythrocytes in *Babesia* (*Piroplasma*) *canis*.**—*J. Parasit.* **26.** 377–385. 4 tables. [Numerous refs.]

The anaemia and corresponding erythrocyte changes were studied in dogs experimentally infected with *B. canis*. All the dogs died as a result of infection, and in each animal a marked anaemia was observed which increased progressively. Splenectomy did not appear to influence the degree of anaemia. Since there was no change in the corpuscular constants, the anaemia may be classed as " normocytic ". The percentage of reticulocytes was not influenced by either age or splenectomy, and the parasites showed no affinity for the young red cells. Splenectomized adults had a greater percentage of infected erythrocytes than entire adults of a similar age. The greatest number of parasitized erythrocytes in splenectomized adults and young dogs with intact spleen was observed a few days before death, whilst the percentage of infected cells in adults with intact spleen was very low or zero.—M. L. BINGHAM.

RAM, C. (1940). **The So-Called 'Lahore**

Canine Fever' and its Treatment.—*Indian vet. J.* **17.** 38–41. 1 table. [2 refs.]

According to SHIRLAW [*V. B.* **9.** 762.] this disease is due to *Babesia gibsoni*. The organism is rarely found in the blood. In experimental cases SEN (1933) has shown the incubation period to be 28–30 days. The usual symptoms are dullness, listlessness, and anorexia. The temperature is usually 103°–105°F. Nasal discharge, irregularity of the bowels, and bloody stools may also be seen. The prognosis is unfavourable. Treatment is not specific and must be combined with good nursing. The most successful drug is tryparsamide, sulfarsenol being also useful in early cases.—R. F. HUTSON, L. R. (1940). **Observations on Anaplasmosis in Antigua, B.W.I.**—*Trop. Agriculture, Trin.* **17.** 147–148. [2 refs.]

Although anaplasmosis had been suspected for some time, its diagnosis was first confirmed in a Holstein cow imported from Barbados (where anaplasmosis is known to exist) in November 1938. This animal was in a selected group of dairy cows which was isolated for three months following arrival. In October 1939 one animal of this group died showing symptoms suggestive of anaplasmosis. A second animal became sick in March 1940; anaplasmosis was suspected and blood smears revealed *A. marginale*. Intravenous injections of 4–6 g. of sodium cacodylate were given, and it is stated that improvement followed.—R. F.

DISEASES CAUSED BY VIRUSES

NEGRI, R. (1939). Un nuovo metodo immunobiologico per l'identificazione dei virus aftosi. [**A New Immunobiological Method of Identifying Foot and Mouth Disease Virus**].—*Riv. milit. Med. vet., Roma.* **2.** 560–567. 4 tables. [8 refs.]

N. describes the determination of the type of a field strain of virus using type-immune g. pigs prepared by vaccination by the Waldmann-Köbe method. The advantage claimed for this method is that it avoids the high mortality occurring when immune animals are prepared by allowing them to recover from a comparatively severe experimental infection.
—J. B. BROOKSBY.

PETRAGNANI, G. (1940). Di un particolare metodo di conservazione del virus aftoso e di alcuni tentativi di vaccinazione. [**Preservation of Foot and Mouth Disease Virus and Experiments in Vaccination**].—*Clin. vet., Milano.* **63.** 45–50. [2 refs.]

Equal parts of epithelium from F. & M. disease vesicles and sodium chloride were ground up, dried *in vacuo* over phosphorus pentoxide, and stored at room temperature. On re-suspension after four months in 10 parts of distilled water the mixture was found to be virulent on intradermal inoculation into cattle. When given subcutaneously only 7–8% of animals treated developed lesions. In investigation of the possible use of the material as a vaccine, 5% tapioca was added to the inoculum to retard absorption of the virus and to enhance the antigenic effect. Of eight cattle receiving the saline-tapioca vaccine one showed a slight F. & M. lesion after inoculation, and the remaining seven resisted a virus of low infectivity with which they were tested after 12 days. Nine cattle were given a larger dose of the vaccine (equivalent to 0·15 g. dried epithelium). When exposed to a potent virus, five developed slight lesions after a prolonged incubation period, while the remaining four resisted.
—J. B. BROOKSBY.

MAZZARACCHIO, V. (1938). La trasmissione sperimentale dell'afta epizootica alla cavia. [**Experimental Transmission of Foot and Mouth Disease to G. Pigs**].—*R. C. Ist. Sanit. pubbl., Roma.* **1.** 301–311. 2 figs. on 1 plate. [6 refs.]

The susceptibility of the g. pig to F. & M. disease depends more on the weight of the animal than on breed or individual variation. M. considers 400 g. to be the optimum weight. Virus from farm animals must be adapted by serial passage before good lesions occur in the g. pig, and, since material from old (72 hour) g. pig lesions is less virulent than from recent (24 hour) lesions, passages should be made with as fresh lesions as possible. G. pig material is best preserved as whole feet in equal parts glycerin and phosphate (pH 7·6) at 5°C. Heat or acid (pH 6·3 or lower) is rapidly destructive of the virus.

Of the routes for experimental transmission, intradermal inoculation of the plantar pads is best, as the lesions develop rapidly and allow

of rapid passage. The technique is illustrated.
—J. B. Brooksby.

Dobberstein. (1939). L'extension de l'anémie infectieuse des points de vue géographique et géologique. **[The Distribution of Equine Infectious Anaemia. Some Geographical and Geological Considerations]**.—*Bull. Off. internat. Epiz.* **18.** 149–166. 7 figs. Discussion pp. 469–470.

The incidence of E.I.A. appears to have greatly increased in recent years, due possibly to the movement of army horses during and after the war of 1914–18. D. describes the occurrence of the disease in various parts of Germany, in France, Norway, Sweden, Japan, and North America and illustrates the distribution with maps. A few isolated cases have been described in Italy; little information is available regarding the position in Switzerland, Luxembourg and Belgium and surprise is expressed that the disease is unknown in England. The disease has disappeared from South Africa, owing to the measures taken to combat it, and it has not been observed in Australia. Accurate information regarding its distribution in many countries has been hampered by the lack of proper statistics and by the fact that, while it may appear as an enzootic in some districts, in others only sporadic cases occur. Experience has shown that as a general rule the disease is not recognized at its first appearance in a district. The relationship between the incidence of the disease and the geological structure of the soil is discussed, and it is pointed out how conditions which have been stated to have favoured the spread in one district may be entirely absent in another, although the disease may occur with equal severity in both. D. suggests that a constituent of the soil may have some connexion with the propagation.
—J. R. Lawson.

Vianello, G. (1940). L'anemia infettiva del cavallo in Lombardia. **[Equine Infectious Anaemia in Lombardy]**.—*Clin. vet., Milano.* **63.** 60–80. 13 figs. [2 refs.]

V. considers that the difficulty in diagnosis of E.I.A. renders it likely that many cases pass unrecognized in Lombardy. The paper, therefore, gives a general account of the disease to aid the practitioner. It contains little new information.—J. B. Brooksby.

Martin, L. A. (1939). L'incubation et le premier accès thermique au cours de l'anémie infectieuse expérimentale des équidés. **[Incubation Period of the First Febrile Attack in Equine Infectious Anaemia]**.—*Ann. Inst. Pasteur.* **62.** 595–615. 6 figs., 3 tables. [16 refs.]

All tests made were upon asses. No fixed rule concerning the incubation period before the appearance of the first febrile attack could be determined and a variation of from 1–28 days was noted. Actual infection was difficult to diagnose in some cases with slight temperature reaction, the only sure proof being passage to another ass by blood inoculation. M. shows that 13 passages of brain tissue by intracerebral inoculation gave as variable an incubation period as when other tissues and routes were used. The variations in differential blood cell counts during the incubation period and first febrile attack are detailed. There was a sharp but transitory increase in neutrophile polymorphonuclear leucocytes corresponding to the thermal reaction. If the disease reaction was grave an increase of 20% of mononuclear leucocytes might occur, but if recovery was rapid the increase might be only 10%. Eosinophile polymorphonuclear leucocytes were reduced to nil during the febrile reaction of grave cases but remained normal in benign cases. M. determined in three asses the exact incubation period (2–5 days) rather than the " apparent " one (10–19 days) between infection and the first febrile reaction, by testing for virus the blood of asses infected by other than circulatory routes (two intracerebrally and one subcutaneously).—C. V. Watkins.

Balozet, L. (1939). Sur la nature du virus de l'anémie infectieuse. **[The Nature of the Virus of Equine Infectious Anaemia]**.—*Bull. Acad. vét. Fr.* **12.** 369–374. [10 refs.]

B. criticizes certain conclusions of von Mocsy [*V. B.* **9.** 848.] in which the latter claims that the virus of E.I.A. is probably inanimate because it is resistant to strengths of X-rays which destroy living agents. He reviews the literature on the exposure of bacteria, tumours, and viruses to X-rays, and suggests that the doses used by von Mocsy were much too small to inactivate viruses.

The distribution of the virus of E.I.A. in the different components of blood serum is also discussed and attention drawn to the false deductions which may arise through failure to recognize that in the salting out of serum, virus

may be mechanically adsorbed to precipitates. —R. E. GLOVER.

HOWITT, Beatrice F. (1939). **Viruses of Equine and of St. Louis Encephalitis in Relationship to Human Infections in California 1937-1938.**—*Amer. J. publ. Hlth.* **29.** 1083–1097. 1 fig., 4 tables, 1 map. [Numerous refs.]

The Western type of equine encephalitis virus, which is present in horses in central California, has been recovered from two human cases. An examination of sera from human beings in this area showed that of 103 tested, 49 neutralized the St. Louis virus, while 32 out of 86 neutralized the equine virus. It was noted that as the age incidence increased the number of sera which neutralized both viruses became higher.

No definite relationship was observed between cases of the disease in the horse and those in man, but the affected districts were in close association with swampy areas which harboured mosquitoes. In view of the evidence in favour of a vector transmission of encephalomyelitis in horses, it is suggested that a similar mechanism may operate in man.—R. E. GLOVER.

CARNEIRO, V. (1939). Anticorpos neutralisantes do virus da doença de Aujeszky em sôros de porcos no Brasil. [**Neutralizing Antibodies for Aujeszky's Disease Virus in the Serum of Pigs in Brazil**].—*Arq. Inst. biol., S. Paulo.* **10.** 305–318. 19 figs. [7 refs.] [English summary].

Basing his investigations on SHOPE's demonstration of the existence of antibodies to the virus of Aujeszky's disease in pigs in the U.S.A., C. reports the same conditions in Brazil. His first experiments were made with 25 young pigs which had been in contact with diseased bovines. Some of these were destroyed and P.M. examinations made, and the sera of another nine were examined. In every case antibodies to the virus of Aujeszky's disease were demonstrated. In another batch of sera 21 out of 23 contained antibodies. C. concludes that Aujeszky's disease affects swine in Brazil but only in a mild form. Most pigs recover. He suggests that the pig acts as a carrier of the virus to cattle in which the disease is much more fatal.—MILLER WATSON.

KERNKAMP, H. C. H. (1939). **The Blood Picture in Hog Cholera.**—*J. Amer. vet. med. Ass.* **95.** 525–529. [11 refs.] [Author's summary copied *verbatim*].

1. The blood picture in hog cholera is characteristic of a severe leucopenia. 2. Occurrence of a leucopenia in three or more pigs of a herd wherein swine are sick constitutes a most valuable aid to a diagnosis of hog cholera. 3. Leucocyte counts of 8,000 cells per cmm. or less are justifiable evidence indicative of a decrease below the normal. 4. No significant change in the numbers of erythrocytes or in the amounts of hemoglobin per unit volume of blood occurs in this disease.

I. —. (1940). **Report of the Committee on Rabies.**—*Proc. 43rd ann. Meet. U.S. Live Stk sanit. Ass., 1939.* pp. 151–162. 1 table.

II. LACROIX, J. V. (1940). **Rabies Control from the Clinician's Viewpoint.**—*Ibid.* pp. 162–166.

III. EICHHORN, A. (1940). **Some New Facts on Rabies Control in Europe.**—*Ibid.* pp. 167–173.

I. This is an informative discussion on the rabies situation in the U.S.A., the gist of the report being that the disease, although controllable, is not being controlled owing to (a) lack of suitable legislation and (b) failure to enforce the existing legislation. The necessary control measures are stated and the role of vaccination is discussed. It can play a useful secondary part in control in a given area, but is of no value when applied outside a properly organized local project.

Appended to the report is a summary of replies from states to a questionnaire sent out in 1939 by the Bureau of Animal Industry, concerning the state control measures and number of cases of rabies observed in 1938. The former vary very much and show the need for unification of control power by a single authority in each state. The statistics are given in a table, which shows that rabies was most prevalent in California (1,735 cases), Indiana and Georgia (over 600 cases each), and New Jersey and Texas (about 570 each), whilst no cases were reported by eight states. [It is remarkable that the heavily affected states do not lie close to each other, but are widely scattered: it is inferred that in many states observations on the incidence of rabies are very deficient.]

II. L. gave an account of the practitioner's difficulties in dealing with rabies in daily practice and without the support of properly enforced legislation. He stated that the commonly used single dose vaccine is often useless

and suggested suitable multiple dose courses of vaccination for prophylaxis and for curative treatment of dogs, using the available killed vaccines permitted for sale in the U.S.A.

III. E. described the success of compulsory vaccination plus legislative control of rabies in Hungary and of the very strict legislative control measures in Prussia which were enforced to prevent the spread of rabies after the invasion of Poland by Germany and the resultant impairment of the frontier barriers. The moral for the American people is that they must submit to strict control measures if they wish to be rid of rabies.—J. E.

—. (1940). **Rabies in the Army—1939.**—*Vet. Bull. U.S. Army.* **34.** 159–160. 1 table.

Vaccination of small animals (7,403 dogs, 296 cats, 3 monkeys, and 1 fox) was continued at 67 army posts during 1939, there being an increase of 1,083 over the 1938 total [see *V. B.* **10.** 672]. The table shows that 15 cases of rabies (2 vaccinated and 13 unvaccinated dogs) were diagnosed on these " military reservations ".—C. V. Watkins.

Balozet, L. (1939). La vaccination antirabique des animaux en Tunisie du 1er janvier au 31 décembre 1938. **[Anti-rabies Vaccination in Tunis during 1938].**—*Arch. Inst. Pasteur Tunis.* **28.** 294–297. 2 tables.

Preventive vaccination of dogs has been performed in Tunis since 1931 and 4,251 vaccinations have now been carried out. The vaccine employed is the etherized vaccine of Remlinger and Bailly. No case of rabies has occurred in any dogs which received preventive vaccination or in dogs which were re-vaccinated after possible exposure to infection.

During 1938, 341 preventive vaccinations and 258 re-vaccinations were performed. Of 48 horses, 32 cattle, and one camel vaccinated after possible exposure to infection, one horse and three cattle succumbed to rabies.—S. J. G.

Majatico, G. (1940). Azione delle salamoie sul virus rabido. **[Action of Brine on Rabies Virus].**—*Profilassi.* **13.** 60–62. 2 tables. [7 refs.] [German summary].

Portions of brain of a rabbit dead from the first passage of a street virus were stored for ten days in 10, 15, 20, or 25% saline. Material from each saline concentration was given to each of two rabbits, and all eight rabbits treated developed rabies. The experiment was repeated with brain stored for 43 days. In this case seven of the inoculated rabbits died and one survived. The surviving rabbit had received material from the 10% saline, while, of three of the fatal cases where death did not take place for seven months after inoculation, two received material from 15% saline and one from 25% saline. M. concludes that, although storage for 43 days does not destroy the virus completely, there is some attenuation, which is greatest with the lower concentrations of salt used.—J. B. Brooksby.

Remlinger, P., & Bailly, J. (1939). Comparaison des vaccins antirabiques phéniqués et des moelles desséchées. **[Comparison of Phenolized Rabies Vaccines and Dried Spinal Cords].**—*Bull. Acad. Méd. Paris.* **121.** 27–30. [2 refs.]

The phenolized, dead vaccine was prepared as follows :– A 5% emulsion of nerve suspension in physiological saline was phenolized to 1%, filtered, and incubated at 37°C. for 24 hours. Comparative experiments were carried out on 42 rabbits and 28 dogs which all received 2 or 5 c.c. of a 1 : 40 emulsion of a virulent street rabies virus the day before vaccination was commenced. Some of the inoculated animals were then kept as controls. The phenolized vaccine gave protection to 40% of rabbits and 70% of dogs, whereas the dried cord vaccine protected 80% of rabbits and 75% of dogs. In view of the equal protection afforded by the two vaccines, the authors stress the other advantages of phenol vaccine, *viz*, facility of administration, rarity of local or paralysing effects, and the possibility of transporting it over long distances.

I. Shoetensack, H. M. (1936). **Pure Cultivation of Filtrable Virus Isolated from Canine Distemper (Part II). Morphological and Cultural Features of *Asterococcus canis, Type I, N.Sp.* and *Asterococcus canis, Type II, N.Sp.*—*Kitasato Arch. exp. Med.* 13.** 175–185. 42 figs. on 2 plates. [Numerous refs.] [In English].

II & III. Shoetensack, H. M. (1936–39). **Studies Concerning the Relation Between Canine Distemper and *Asterococcus canis*,** Type I and II. (Parts I & II).—*Ibid.* 269–280, and **16.** 285–305. 6 tables. [2 refs.] [In English].

I. A previous investigation by S. [*V. B.* **5.** 272.] showed that filtrable organisms resembling that of pleuro-pneumonia could be grown from

cases of distemper on solid media. Two main types are described. The first, termed *A. canis* type I n.sp., is easily filtrable; in culture it shows numerous involution forms resembling *A. mycoides*, *e.g.*, coccoid or rod elements, filamentous rings, forms with nodules and various types of asteroids. The second organism, *A. canis* type II n.sp. as encountered in natural material, will not pass through candles, although cultivated forms are filtrable. The growth characteristics, viability, and thermal resistance of these organisms are described.

II. In order to determine the frequency with which positive cultures of the filtrable organisms mentioned in I could be obtained from dogs affected with distemper, preparations were made from 15 typical cases of the acute respiratory type. *A. canis* type I was recovered from 14, *A. canis* type II from three. It is stated that a second series of animals which received two injections of a vaccine prepared from these organisms were moderately resistant to distemper: in addition, asterococci were not isolated from their organs.

III. Large-scale experiments on the immunization of dogs with killed cultures of these organisms are described. The vaccine was prepared by seeding the asterococci on blood agar slants covered with meat, and blood digest broth containing 1 : 1,000 cystine in alkaline glycerin. The growth, collected after three days, was treated with 0·25% phenol and 0·005% brilliant green. The efficacy of the vaccine was first tested on badgers which are highly susceptible to distemper, and show a mortality rate of 80–100%. It was noted that two injections of 2 c.c. were completely effective as a prophylactic, while in fairly advanced cases of the disease the vaccine considerably reduced the numbers of fatalities.

Field trials were also carried out on dogs when 600 animals were inoculated. It was reported that 85% were completely protected, while an additional 11% were partially immune. The curative effect was also examined, the results being summarized in a table which indicates that of 120 animals which were treated, 92% recovered.—R. E. Glover.

Scott, J. P. (1939). **Swine Influenza.**—*Rep. 13th int. vet. Congr. 1938.* **1.** 479–490. 3 tables. [15 refs.] [In English: French, German and Italian summaries. Discussion pp. 497–500 in English, French and German].

First recognized as a disease entity in 1918, swine influenza is an acute contagious disease of short duration which affects pigs of all ages but is commonest in those of from six to ten months of age. It occurs chiefly during the last three months of the year but may also occur in late summer during bright warm weather. Characteristic lesions are atelectasis, peribronchial pneumonia and bronchiolar catarrh. The disease may be readily transmitted to susceptible pigs by contact or by intranasal instillation of lung filtrate or glycerinated lung emulsion mixed with cultures of *Haemophilus influenzae suis*. The virus may be cultivated in developing chick embryos, being pathogenic for mice after 32 passages and for swine after 7 and 22 passages. It was shown that virus obtained from a strain passed through 50 or more mouse passages and virus obtained from the same strain passed through 22 or 30 chick embryo passages, had approximately the same virulence for mice up to dilutions of 1 : 10,000 in nutrient broth. Dilution tests showed that the mouse lung virus and embryonic fluid from inoculated chick embryos produced moderate lesions in mice given doses of virus as low as 1 : 100,000,000.

Neutralization of swine influenza virus by swine influenza antiserum was demonstrated by chick embryo inoculation. 20–40% emulsion of affected lung tissue obtained from experimentally or naturally infected cases of swine influenza were passed through Berkefeld filters and the sterile filtrate mixed with equal parts of broth, normal serum, and swine influenza serum obtained from pigs which had been given intranasal instillation of swine influenza virus 10–14 days before bleeding. These mixtures were injected into the chorio-allantoic membranes of embryos 10–12 days old in doses of 0·25 c.c. The results of the neutralization tests and the other tests carried out are given in tabular form; and details are given of immunization experiments which were effected in pigs by intranasal instillation of swine influenza virus. In connection with this latter experiment it was shown that large doses of *Pasteurella suiseptica* are nonpathogenic for swine when administered intranasally. In the discussion S. describes successful vaccination experiments with 8 c.c. of a 1 : 10 dilution of embryonic fluid from a 38th egg passage strain of the virus, which had been carried out since the paper was written.—J. R. Lawson.

I. Panisset, L. (1936). Grippe de l'homme, grippe du porc, maladie des chiens

(Maladie de Carré). Les rapports de leurs virus. **[The Relations between the Viruses of Human Influenza, Swine Influenza and Dog Distemper].**—*Biol. méd.* **26.** 109–112. [11 refs.]

II. Shaw, D. R., Kenney, A. S., & Stokes, J. (1939). **Serologic and Immunologic Studies Relative to the Viruses of Human and Swine Influenza.**—*Amer. J. med. Sci.* **197.** 247–253. 4 tables. [4 refs.]

III. Horsfall, F. L., Lennette, E. H., Rickard, E. R., Andrewes, C. H., Smith, W., & Stuart-Harris, C. H. (1940). **The Nomenclature of Influenza.**—*Lancet.* **239.** 413–414. [7 refs.]

I. Attention is directed to the possible relation of human and swine influenza and canine distemper as a result of the adaptation of these viruses to the ferret. The article contains no new observations.

II. Previous observations on the question of strains of human influenza "A" virus differing antigenically, have been confirmed by the use of immune ferret sera as indicators. Thus two strains of American origin from the 1937 outbreak were identical with PR.8 virus but differed from the English W.S. strain and from a swine virus supplied by Shope.

A number of pig sera was obtained from areas in which the 1937 human epidemic had occurred, both before and after the outbreak. They were tested against the same strains of virus mentioned above. It was found that many of the sera from the older pigs showed antibodies against American human influenza virus but not against the W.S. or the porcine strains, whereas sera from the younger animals failed to neutralize any of the viruses. There is an implication, therefore, that the older pigs had been infected with human virus. [The term " influenza A virus " is used in accordance with the recommendation of prominent English and American workers on this subject, see III.]

III. Widespread outbreaks of influenza have been described in which the ferret-pathogenic virus isolated by Smith, Andrewes, & Laidlaw [*V. B.* **4.** 357.] was apparently not concerned. To avoid confusion it is suggested that in future a more precise nomenclature should be adopted and that the specific disease entity caused by infection with any one of the various strains of the virus discovered by Smith, Andrewes and Laidlaw (1933) should be termed influenza A.

The separation of influenza A leaves a group clinically resembling influenza but of unknown aetiology. If other viruses of aetiological significance are subsequently isolated they could be labelled Influenza B, C, etc. In order to correlate the findings of individual groups of workers, it is suggested that before final classification, new viruses should be submitted to the National Institute for Medical Research, or to the Rockefeller Institute for further study.

Influenza-like diseases attacking animals are excluded from this scheme.—R. E. Glover.

Straub, M. (1940). **The Histology of Catarrhal Influenzal Bronchitis and Collapse of the Lung in Mice Infected with Influenza Virus.**—*J. Path. Bact.* **50.** 31–36. 7 figs. on 2 plates. [1 ref.]

A histological study of the lungs of mice infected with human or mice strains of influenza virus shows that disintegration of the bronchial epithelium, which is manifest at the 24th hour, is the most important lesion. The subsequent changes are attributed to collapse of the lung tissue through occlusion of the bronchi with mucus and cellular debris. Regeneration of the terminal bronchioles commences about the fifth day.

It was found that the action of a weak virus could be augmented by treating the mouse intranasally with dilute diphtheria toxin prior to the virus suspension. Tyrode solution also aggravated the degree of bronchial catarrh caused by virus. An experiment is cited suggesting that, in mice, immunity to influenza occurs only when a severe catarrhal infection with metaplastic epithelial changes is produced: a simple catarrh, from which there may be recovery without any traces remaining, gives no protection.—R. E. Glover.

Francis, T., Jr. (1940). **The Inactivation of Epidemic Influenza Virus by Nasal Secretions of Human Individuals.**—*Science.* **91.** 198–199. 1 table. [2 refs.]

Nasal washings from 33 human beings suffering from common cold or from hay fever, and from 15 normal people, were tested for influenza antibodies by mixing with 1,000 lethal doses of PR8 strain (mouse lung virus) and inoculating intranasally into young mice. There was little difference in the two groups since in each instance approximately one-half caused almost complete inactivation of the virus, while the other half exerted slight or no effect.

The neutralizing agent was stable at low temperature but was rendered ineffective after

heating at 70°–75°C. for 20 min. It did not appear to arise from bacterial action and was not related to lysozyme. Comparative studies with sera obtained from 20 patients in each group indicated that there was some relationship between serum and nasal antibodies.

—R. E. Glover.

Arlein, M. S. (1940). **So-Called Feline Enteritis or Panleucopenia.**—*N. Amer. Vet.* **21.** 733–737. [12 refs.]

A. states that the virus nature of this disease is now beyond doubt and that several workers have shown that the infection is chiefly characterized by changes in the haematopoietic system. The chief clinical symptoms are anorexia, pyrexia, vomition, and a marked dehydration. The only important finding is a fulminating leucopenia; this is constant and diagnostic. A white cell count of below 6,900 per c. mm. constitutes a leucopenia. The mortality rate is about 64%. Among the P.M. findings are a mild enteritis, haemorrhages in the lungs, and oedema of the lymph nodes. Histopathological changes occur in the gastro-intestinal and haematopoietic systems. Intranuclear inclusion bodies have been found in lymph nodes, spleen, intestinal mucosa, and bone marrow, the latter being considered the principal focus of infection. Recovered animals are permanently immune. The prophylactic use of vaccines may prove of value. Immune serum confers a useful passive immunity but is of no use in treatment.—R. Fisher.

Iyer, S. G. (1940). **Some Observations on the Viability of Doyle's Disease Virus of Fowls under Different Conditions.**—*Indian J. vet. Sci.* **10.** 81–87. 4 tables. [5 refs.]

A brief review of the literature is given followed by the results of experiments on the viability of Newcastle disease virus as contained in the liver and spleen or buccal washings of experimentally infected fowls, under varying conditions. The virus remained viable after storage for 21 days at room temperature (average 17°C.) but not after 28 days. At 37°C. virus contained in buccal washings remained viable for only three days whereas the same strain of virus in liver and spleen pulp was active even after 24 days.

Exposure of the virus to direct sunlight for one hour did not affect its viability; the time when the virus would become non-viable was not determined. Some of the results reported are paradoxical. This may have been due to variation in the individual susceptibility of fowls and also to the fact that the tests were carried out with virus obtained from different donors. Further, it is interesting to note that the fowls used in these experiments became affected with a subacute form of the disease; some of the fowls died three weeks after inoculation.

Weineck, E. (1939). Ueber die Aktivierung des Hühnerpestvirus durch Erythrozyten. [**Activation of Fowl Plague Virus by Erythrocytes**].—*Z. Immun-Forsch.* **97.** 189–193. [8 refs.]

It had previously been found that fowl plague virus is about five times more rich in the erythrocytes than in the blood plasma. W. experimented on infected fowl embryos to study their behaviour before and after the formation of the blood islands, *i.e.* to appreciate the action of the virus in the bloodless and blood-containing body.

The primitive streak of the embryo was infected with virus :– (1) before incubation of the egg; (2) after 24 hours' incubation, and (3) later, shortly before the formation of blood islands. It was found that the true pathogenic effects of the virus were not manifested until after the formation of the blood islands and erythroblasts, thus indicating the important role of red blood corpuscles in fowl plague.

—J. E.

Geiger, J. C., Crowley, A. B., Meyer, K. F., & Eddie, Bernice U. (1939). **Administrative Problems in Connection with Psittacosis and the Importation of Australian Parrots.**—*J. Amer. med. Ass.* **113.** 1479–1481.

An account of psittacosis among a shipment of 55 parrots imported from Queensland for exhibition purposes in America. Quarantine measures were not fully observed, nor were the necessary hygienic precautions taken. Observations made confirmed the probability that exposure and improper care activate latent virus in carriers, thus causing acute infections among the cage mates. It is suggested that the quarantine period should be extended from 14 days to not less than three months and preferably to six months. Complement-fixation tests should be made on large, expensive birds, while 10–20% of a shipment of smaller birds or parrotlets should be killed and examined P.M., mouse inoculation tests being made. While in quarantine, cages with rice birds (*Padda oryzivora*) should be distributed

throughout the building to test for contamination of the air with virus. Full precautionary measures should be taken by all workers coming into contact with the birds, *e.g.* wearing of rubber gloves, masks, and goggles.

I. McFarlane, A. S. (1940). **The Electrical Double Layer and Virus Stability.**—*Trans. Faraday Soc.* **36.** 257–264. 3 figs. on 2 plates. [Numerous refs.]

II. Shedlovsky, T., & Smadel, J. E. (1940). **Electrophoretic Studies on Elementary Bodies of Vaccinia.**—*J. exp. Med.* **72.** 511–521. 2 figs., 1 table. [18 refs.]

III. Smadel, J. E., Pickels, E. G., Shedlovsky, T., & Rivers, T. M. (1940). **Observations on Mixtures of Elementary Bodies of Vaccinia and Coated Collodion Particles by means of Ultracentrifugation and Electrophoresis.**—*Ibid.* 523–529. 7 figs. on 1 plate. [8 refs.]

I. This paper is a contribution to a general discussion on the electrical double layer. The factors responsible for the stability of aqueous colloidal solutions are described and it is pointed out that cells and bacteria are more akin to lyophobic colloids in their properties than to the lyophilic proteins.

The plant viruses behave in most of their stability properties as typical soluble proteins, but the elementary bodies of vaccinia virus contrast sharply with these and resemble lyophobic sols. This contrast is exhibited in the electrophoretic properties of the two groups of viruses, unusual disturbances occurring at the migrating boundaries of vaccinia virus suspensions. Possible reasons for this phenomenon are discussed, endosmotic effects being considered the most likely cause.

Experimental evidence is against the supposition that the vaccinia body is delimited by a semi-permeable membrane.

Soluble proteins are in complete equilibrium with the medium, but this does not appear to be true of the vaccinia elementary bodies. The implications of this conclusion are considered.

II. The occurrence of unusual but reproducible boundary phenomena during the electrophoresis in the Tiselius apparatus of buffered aqueous suspensions of vaccinia virus [see I], attributed to endosmotic effects, is confirmed. Similar effects were observed with collodion particles of approximately the same dimensions as the virus elementary bodies, whether protein-coated or untreated, and with protein-coated pyrex glass particles, in aqueous suspensions. The boundary disturbances tended to decrease in each case as the particle concentration was raised.

Suspensions of virus and collodion particles in a medium containing protein showed no boundary disturbances if the protein concentration was sufficiently high.

The authors suggest that the disturbances occur in consequence of the very small density differences between the particle suspension and the supernatant buffer. The presence of protein superimposes a large density gradient on the migrating particle boundary.

The effect on the electrophoretic mobility of treating the virus in various ways is described and the suggestion made that the particles behave as if almost completely covered with S-antigen. Immunological evidence bearing on this point is considered.

III. The behaviour of suspensions of vaccinia virus, of collodion particles of approximately the same dimensions coated with S-antigen, and of mixtures of the two are described. Each of these materials shows a single boundary in the ultracentrifuge and electrophoresis apparatus.

The authors consider that the data indicate that ultracentrifugal and electrophoretic evidence of homogeneity for ultracentrifuge fractionated material should in certain cases be treated with reserve, and wherever possible should be taken in conjunction with biological evidence in assessing the purity of virus preparations.—R. A. Kekwick.

Stanley, W. M. (1940). **Properties of Viruses.**—*Rep. Proc. 3rd int. Congr. Microbiol. 1939.* pp. 43–53. New York: International Association of Microbiologists. [In English].

S. summarizes the present position regarding the components of high molecular weight which have been isolated in a state of considerable purity from various virus suspensions. It has been shown that appreciable concentrations of active principle have been achieved, but it has not yet been proved beyond doubt that different fractions which have been isolated are essentially homogeneous and, therefore, represent viruses in an essentially pure condition. There is reason for believing that virus activity is characterized by combinations of amino- and nucleic acids. Future progress in this field is, therefore, regarded as a problem of structural organic chemistry.

The paper does not lend itself to abstracting

and should be consulted in the original by those interested in the subject.—R. E. GLOVER.

GRAINGER, J. (1940). **Virus and Vital Organization.**—*Nature, Lond.* **146.** 539–541. 3 figs. [10 refs.]

G. discusses the difficulties in defining the qualities which separate living from non-living material. Reproduction is an unreliable criterion since the rates of increase of living organisms and of non-living autocatalysts are remarkably similar, while irritability is of even less value. Movement, however, is of some significance since living agents are not completely at the mercy of their environment, whereas inanimate objects are solely dependent on their surroundings. In plant pathology, it can be shown that migration of virus is independent of streams of nutrient, water, or protoplasm.

G. does not consider that the results of experiments which show that certain viruses are crystalline proteins are necessarily an argument against their living nature.—R. E. G.

BEDSON, S. P. (1940). **Virus Diseases Acquired from Animals.**—*Lancet.* **239.** 577–579. [16 refs.]

In this article three virus diseases of animals which are transmissible to man, *viz*, rabies, equine encephalomyelitis, and psittacosis, are discussed in detail. They are selected as exemplifying three main methods of spread, namely, direct contact, transmission by insects, and inhalation of infective particles. There are no new observations, but there is an interesting discussion on the embargo on the importation of cage birds and the reasons why it has failed to effect a complete control of psittacosis in this country.—R. E. GLOVER.

PARASITES IN RELATION TO DISEASE [ARTHROPODS]

UNDERHILL, G. W. (1939). **Two Simuliids Found Feeding on Turkeys in Virginia.**—*J. econ. Ent.* **32.** 765–768. [2 refs.]

The immature stages of *Simulium nigroparvum* (which transmits *Leucocytozoon smithi*, a protozoan parasite of turkeys) occur in the mountainous area in the larger streams with flat, rocky bottoms, especially where the water willow, *Dianthera americana*, is present and the current is 4–5 ft. per sec. The larval habitat of *S. slossonae* was not discovered.

The female flies attach themselves to the head and neck region of the turkey, becoming engorged in 2–3 min. They bite at any hour of the day, the optimum conditions for feeding apparently being high humidity, low atmospheric pressure, and a temperature of 75°–85°F.—R. P. HOBSON.

CHORLEY, J. K. (1938). **A Short Historical Account of Tsetse in Southern Rhodesia.**—*Proc. Rhod. sci. Ass.* **36.** No. 12. 41–51.

Discussing the importance of the tsetse fly, C. points out that in "fly" areas pastoral people with their herds cannot exist. Without cattle no system of soil improvement or maintenance of fertility can be devised, and, without their milk, problems of deficiency diseases in the human population arise. To the African people cattle mean wealth, and without cattle the whole economic system breaks down. To all this may be added the scourge of sleeping sickness which it is thought may cause 50,000 deaths a year, despite the efficacy of modern drugs.

It is considered that tsetse distribution probably never exceeded the area affected to-day, and it is suggested that it was fly disease in transport animals and malaria in human beings which prevented the penetration of Rhodesia by the Arabs, Portuguese, and Boers; it is also suggested that tsetse distribution largely controlled the migrations of the Bantu tribes.

Accurate information regarding tsetse distribution began to accumulate after the Matabele had been driven out of the Transvaal in 1840, and reference is made to the records of the early hunters and missionaries, of whom the most important appear to have been LIVINGSTONE (1857), KIRK (1865), MAUCH (1865–1869) and BAINES (1877). Sometime during the 1870's the fly belt in the Limpopo valley began to break up, and lanes were formed along which hunters could come into Rhodesia. The tsetse which had held up the Boers for fifty years now gave RHODES his chance.

After the rinderpest epizootic of 1895–96, the southern fly area and the small belt at the Victoria Falls completely disappeared. This is ascribed to the complete extermination of buffalo and other big game, although it is admitted that the flies had already disappeared from much of the southern area before 1890.

Though mining activities eradicated certain belts, other areas began to expand again, until, in 1918, 9,000 sq. miles of Southern Rhodesia were tsetse infested, and from then until 1929 the increase was 1,000 sq. miles a year.

Destruction of game as a defensive measure was first tried out in the Wankie district in 1918, and was extended to other areas in 1925–26, reinforced by the provision of fences. This method of defence is considered a measure of proved efficacy which can be applied to any area on the periphery of a fly belt.

The immediate objects now aimed at in Southern Rhodesia are :– (a) to drive the fly below the escarpment in the northern district ; (b) to clear the Darwin area ; (c) in the Hartley, Sebungwe, and Lomagundi districts to drive the fly behind a line running from north of Gokwe to north of the Copper Queen mine, and (d) in the Wankie, Bubi, and Sebungwe districts eventually to drive the fly behind a line running from Gokwe to Tshete.—U. F. R.

LARSON, C. L., & GREEN, R. G. (1938). **Seasonal Distribution of Tick Parasites.** —*J. Parasit.* **24.** 363–368. 1 table. [5 refs.]

The chalcid parasite *Ixodiphagus texanus* was recovered from the ticks *Haemaphysalis leporis-palustris* feeding on snowshoe rabbits in Minnesota, where this parasite appears to be widely distributed. During the period of activity of the tick, April to November, collections of nymphal and larval ticks from rabbits were examined for the parasites. The total incidence was under 6%, indicating that *I. texanus* is not at present an important factor in controlling the rabbit tick in Minnesota. The highest incidence was during August and September. Parasites were obtained practically throughout the period of tick activity, indicating that some at least pass the winter as latent parasites in gorged or unfed ticks. When the ticks were kept under natural temperature conditions, emergence of the parasites occurred chiefly in August and September. Since tick activity decreases rapidly after mid-October, the probability of more than one generation of the parasite occurring in the year is remote. —J. MACLEOD.

MACLEOD, J. (1934). *Ixodes ricinus* **in Relation to its Physical Environment : the Influence of Climate on Development.**—*Parasitology.* **26.** 282–305. 6 figs., 8 tables. [8 refs.]

Laboratory experiments in which either temperature or humidity were constant showed that the optimum temperature for rapid development of *I. ricinus* is dependent on humidity, and conversely the optimum humidity is dependent on temperature. Development is possible over a range of temperatures from about 59°–95°F. and a range of relative humidities from 80–85% to 100%. Moderate fluctuations of temperature within the favourable limits do not accelerate development, while slight changes in barometric pressure do not appear to have any effect.—W. MOORE.

MUCCIOLO, P. (1939). Sarna demodécica nos suinos. **[Demodectic Mange in Swine].** —*Rev. Soc. paul. Med. vet.* **5.** No. 4. Reprint pp. 10. 4 figs. on 2 plates, 3 tables. [14 refs.]

This is largely an account of the frequency of demodectic mange of swine in Brazil. Statistics of the depreciation in value of carcasses of affected swine are also given. Having examined a large number of cases, M. maintains that the parasite is not found in the hair follicles or sebaceous glands, as has been widely believed, but in the sweat glands. He believes that this explains the difficulty of treatment. Histological sections were made of many affected tissues, and photographs illustrate the lesions caused in the sweat glands. —MILLER WATSON.

PARASITES IN RELATION TO DISEASE [HELMINTHS]

CAMPBELL, D. H. (1939). **A Polysaccharide Fraction from *Cysticercus crassicollis* and its Rôle in Immunity.**—*J. infect. Dis.* **65.** 12–15. 2 tables. [4 refs.]

C. has already isolated a specific polysaccharide fraction from certain parasitic helminths [see *V. B.* **9.** 783.], and further experiments were carried out to determine the role, if any, of such substances in immunity. It was shown that the polysaccharide antibodies played no apparent role in protection against infection, for rats could not be artificially immunized with a purified polysaccharide obtained from *C. crassicollis*, which induced the formation of specific precipitins in rabbits and of anaphylactins in g. pigs. Removal of the polysaccharide precipitins by specific absorption had no effect on the protective power of serum

from rabbits which had been immunized against whole worm material, and no protective power could be demonstrated for the anti-polysaccharide antibodies induced by injection of the polysaccharide alone into rabbits.

—M. L. BINGHAM.

VAZ, Z. (1939). Redescrição e novos hospedadores de " Capillaria perforans Kotlan et Orosz, 1931 "; nematode patogénico para aves domesticas. [**Re-Description of, and New Hosts of *C. perforans*, a Pathogenic Nematode of Fowls**].—*Arq. Inst. biol., S. Paulo.* **10.** 87–92. 12 text-figs., 2 figs. on 1 plate. [3 refs.] [English summary].

The author describes a nematode of guinea fowls (*Numida meleagris*) in São Paulo, which he identifies as *C. perforans*. As some authorities have identified *C. perforans* with *C. contorta* a detailed description is given of the former which emphasizes the main points of difference between the two species. *C. perforans* is stated to be very much larger than *C. contorta*, males reaching a maximum length of 57 mm., and the females of 150 mm. The male of *C. perforans* shows a distinct broadening of the posterior part of its body, a feature not described in *C. contorta*. The spicules of *C. perforans* are very long and easily visible, although they are very delicate.

The parasite was also found in pheasants and in guinea fowls (*Numida ptilorhyncha*).—M. W.

GALLIARD, H. (1940). Recherches sur la strongyloïdose au Tonkin. Rôle des animaux domestiques dans l'étiologie de l'infestation humaine. [**Role of Domestic Animals in the Aetiology of Human Strongyloid Infestation in Tonkin**].—*Ann. Parasit. hum. comp.* **17.** 533–541. 5 figs. on 1 plate. [14 refs.]

Strongyloidosis in the dog and cat is very rare in Tonkin, but G. easily infected dogs with *S. stercoralis* of human origin. Cats were found to be more resistant. Young dogs, infected percutaneously with large doses, died in about 12 days. This strain retained its virulence after several passages. Many dogs which had received a massive and fatal dose never excreted larvae in the faeces. It was found that a human strain, exhibiting both direct and indirect developmental cycles, showed only the direct cycle after successive passages in dogs. This is in contrast with the results reported by American writers, whose work on strongyloidosis in man and animals is discussed at some length.—M. L. BINGHAM.

KUBO, M. (1938). **The Daily and Seasonal Periodicity of *Microfilaria immitis* in the Peripheral Blood of the Dog.**—*Chin. med. J.* Suppl. No. 2. pp. 375–384. 13 figs., 1 table. [3 refs.] [In English]. [Author's summary copied *verbatim*].

Two dogs naturally infected with *Dirofilaria immitis* were, during a period of twelve months, examined fortnightly for the number of microfilariae in the peripheral blood. Three blood smears of each dog were made at two-hour intervals over a period of 24 hours. It was found, in agreement with the statement of previous investigators, that there is a daily " turnus " with a maximum during the hours of late evening and night, and a minimum from the early morning towards noon. This daily " turnus " is not so regular and fixed as in certain other kinds of microfilariae. The difference in the number of microfilariae at the same hour on different days depends in the first place on the season of the year. There was found a very pronounced seasonal periodicity with a maximum of microfilariae in the peripheral blood towards the end of August and the beginning of September, and a minimum between November and December. The examinations were carried out in Peiping where the dogs were exposed to great seasonal difference of temperature.

IMMUNITY

VELLISTO, E. (1939). Diagnose der Brucellose vermittels der Grenzwerte der Agglutinationsreaktion (bei Mensch und Tieren). [**The Titre of the Agglutination Test for the Diagnosis of Brucellosis**].—*Z. ImmunForsch.* **97.** 68–76. [10 refs.]

The author discusses the titre which should be regarded as positive in blood tests made with a view to the diagnosis of brucella infection, drawing attention to the fact that for bovines the titre accepted as positive in different countries varies from 1 : 10–1 : 200. The difference depends in part on differences in test methods but also partly on differences of viewpoint as to what cows should be segregated.

He supports the opinion that it is not sufficient to take as positive a titre which is known to indicate a high probability of excretion but advisable to take one which will indicate that the animal is very unlikely to be, or soon to become, an excreter particularly when the animal is being introduced into a clean herd. He stresses the need for taking a more severe line in herds in which the disease is spreading actively than in herds in which the disease is quiescent.

From his experience in testing of samples collected in a non-infected environment in Estonia he concludes that with his test method, read at three days, complete agglutination at the following titres should be regarded as abnormal :– for cattle, sheep, swine, and human beings 1 : 20 ; for horses 1 : 80 or possibly 1 : 40, and for calves and g. pigs, 1 : 1. He states that a titre of 1 : 20 with his methods corresponds to a titre of 1 : 80 in the test as made by WALL [*V. B.* **10.** 851.] and 1 : 40 as made with standard British suspension by STABLEFORTH [*V. B.* **7.** 185]. A rapid method of testing is also described but it is said here and elsewhere to be less accurate than the ordinary slower method.—A. W. S.

I. VELLISTO, E. (1940). Das Bestimmen der Spezifität der Agglutinationsreaktion. **[The Determination of the Specificity of the Agglutination Reaction (Brucellosis)].**—*Z. ImmunForsch.* **97.** 380–392. 1 fig., 3 tables. [6 refs.]

II. VELLISTO, E. (1940). Die Technik der Diagnose der Brucellose. **[The Technique of the Diagnosis of Brucellosis].**—*Ibid.* 393–401. [3 refs.]

I. The author claims that the specificity of an aggln. reaction, in particular for *Br. abortus*, can be determined by one of two methods. In the first the test is made with two suspensions, one of *Br. abortus* and the other of *Salmonella pullorum*, the extent of the nonspecific aggln. being measured by the latter and subtracted from the former. In the second, he states that specific agglutinins are more heat stable than the nonspecific and that a temperature of 62°–63°C. for 15–20 min. destroys the latter. [No particular reason is given for taking *S. pullorum* as the test bacterium for nonspecific aggln. and it is not established that the use of some other bacterium would not have given entirely different results for nonspecific aggln. and therefore for specific aggln., and the data in support of the heating of sera to 62°–63°C. do not appear adequate to support the author's conclusions.]

II. The author describes in detail the method he recommends for the agglutination test for brucella infection. Briefly, this consists of the setting up of final dilution 1 : 20–1 : 80, using a test suspension containing 500 million organisms per c.c., *i.e.* equivalent to half the opacity given by mixing 97 c.c. of 1% H_2SO_4 with 3 c.c. $BaCl_2$. He recommends the use of two suspensions, one brucella, the other pullorum [see I] in order to distinguish nonspecific and specific aggln., and heating of the sera in cases when border line titres are obtained. Rapid methods are not regarded as giving accurate results in border line cases.

—A. W. STABLEFORTH.

KUJUMGIEFF, I. (1940). Beitrag zur Gewinnung der präzipitierenden Antimilzbrandsera von Pferden. **[Anti-Anthrax Precipitating Serum from Horses].**—*Z. ImmunForsch.* **97.** 436–448. [10 refs.]

K. describes his experiences in the preparation of anti-anthrax precipitating sera from nine horses over a period of three years. An old capsulated strain was used for immunization, the organisms being killed with 0·4% formalin for non-immune animals and for certain injections in hyper-immunized animals.

He concludes that more active sera can be prepared in hyper-immune animals than in non-immune animals. Previous immunization with dead or living organisms for the purpose of producing anthrax precipitating serum has a favourable effect in producing a quick response to later courses of injection. A prolonged course of immunization, and numerous injections even if of small amount also favour the production of active sera. Age and condition appeared to have little effect.

Preservation of sera with 0·5% phenol had no deleterious effect up to two years, but preservation with 0·5% chinosol reduced the precipitin value within three months.—A. W. S.

MADISON, R. R., FISH, Margaret, & FRICK, O. (1938). **Vitamin-C Inhibition of Agglutinin Production.**—*Proc. Soc. exp. Biol., N.Y.* **39.** 545–547. 1 table.

Groups of rabbits were injected intravenously with an arbitrary dose of sheep erythrocytes, or of living, heat-killed or formalin-killed suspensions of *Proteus vulgaris*, *Bacterium coli*, or *Salmonella typhi* ; one minute after each injection half the animals of each

group were given an intravenous injection of 50 mg. ascorbic acid in 1 c.c. sodium chloride solution. Very low antibody titres were obtained as a result of these single injections indicating that ascorbic acid had only borderline effects on antibody yield, except on the yield of specific agglutinins, as in three groups injected with *S. typhi*, the yield of specific agglutinins was reduced about 50%. To magnify these borderline effects 7–13 multiple injections with the same antigens were given, followed by 50 mg. of ascorbic acid. The results show that multiple doses of ascorbic acid increase specific precipitin production against bacterial vaccines about 80% but this borderline beneficial effect is more than offset by the 50% reduction of specific agglutinins. —R. Allcroft.

Thompson, W. R., & Maltaner, F. (1940). **On the Construction of Graphs and Tables for Evaluation of the Quantitative Complement-Fixation Reactions and Reaction Ratios.**—*J. Immunol.* **38.** 147–157. 5 figs., 1 table. [7 refs.]

The use of the complement-fixation reaction as a means of obtaining a measure of the reactivity of sera has been put on a quantitative basis by expressing the relation between the number of units of complement used (x) to the degree of haemolysis found (y) in the equation:– $\log x = \log K + L. \log \frac{y}{1-y}$. For most reactions K and L are constants, in others L may vary as a function of K. From these data further mathematical and graphical developments have been made, for details of which the original should be consulted, and these have enabled nomograms and tables to be constructed, from which quantitative complement-fixation reactions and reaction indices can be readily evaluated.—Alfred Eden.

Singer, A. J. (1939). **Cross Neutralization of Staphylococcus Toxins by Immune Sera.** —*Thesis, Cornell.* pp. 47. [Num. refs.]

Investigations to determine whether certain strains of staphylococci originating in animal tissues were identical or related to the common *Staph. aureus* of man. Procedures used included the production of toxic filtrates which were then detoxified and used as antigens for the immunization of rabbits. The immune sera produced in the rabbits were then tested for their neutralization of homologous and heterologous filtrates. S. concludes that apparently, from a serological standpoint, *Staph. aureus* of animal origin is identical with strains of this organism found in human infections.—Herbert L. Gilman.

Nakazima, T. (1939). **Experimental Study of Influences of Cervicothoracal Symphatheco-Ganglionectomy and Cervical Vagotomy on the Protective Function of the Cells in the Lungs of Rabbits against Acute Pathogenic Bacteria. Report IV. Protective Conditions 30 minutes after Intratracheal Injections with Acute Pus Cocci a Month after Operations. Report V. Part I. Protective Conditions 30 Minutes after Intratracheal Injections with Acute Pus Cocci Three Months after Operations.**—*J. orient Med.* **30.** 185–186 and 187–188 of European abstrs. [In English].

One of the following operations was performed on the right cervical region of rabbits :– group A, cervico-thoracic sympatheco-ganglionectomy ; group B, cervical vagotomy ; group C, cervico-thoracic sympatheco-ganglionectomy and cervical vagotomy ; and group D, an incision reaching the cervico-thoracic sympathetic nerve and vagus. One month later an intratracheal injection of *Staphylococcus aureus*, *Streptococcus pneumoniae*, or *Bacterium coli communior* was made into each animal. Histological findings after 30 minutes were :– group A, the rate of phagocytosis and the inflammatory reaction in the lung tissues on the right side were considerably greater than in the controls ; group B, these reactions were much slighter than in controls ; group C, the reactions varied considerably but were never so severe as those of group A ; and group D, no difference was observed between operated animals and controls. The different bacteria used set up very similar conditions of phagocytosis and inflammation.

A second series of experiments was performed under identical conditions except that injections of bacteria were not made until three months after the operations. The results were similar except for group C, where phagocytosis and the inflammatory reaction were less even than in group B. It was observed that although the effects on the protective action of the cells of operating on the autonomic nerve lasted for three months, yet they were slightly less than those observed a week or a month after the operation.

KERMACK, W. O., & MCKENDRICK, A. G. (1938). **Contributions to the Mathematical Theory of Epidemics. V. Analysis of Experimental Epidemics of Mouse-Typhoid; A Bacterial Disease Conferring Incomplete Immunity.**—*J. Hyg., Camb.* **39.** 271–288. 5 figs., 3 tables. [7 refs.]

An analysis was made of the progress of an epidemic of mouse typhoid in a relatively large herd of mice. The immunity resulting from an attack was only partial, with a general incubation period of 13 days. This partial immunity considerably increased the complexity of the mathematical treatment and the relatively long incubation period also required special consideration. Life-tables, as constructed by GREENWOOD, NEWBOLD, TOPLEY and WILSON, were fitted on the basis of the mathematical theory and the agreement between theoretical and observed results was reasonably close after the theory had been modified to suit the long incubation period. The average reader may find the extensive mathematical treatment rather difficult to follow.—ALFRED EDEN.

DISEASES, GENERAL

JARDINE, E. F. (1940). **Contagious Keratitis in Cattle. [Correspondence].**—*Vet. Rec.* **52.** 609–610.

J. records an outbreak, the onset of which was rapid. The usual symptoms, which affected both eyes, were a watery or purulent discharge, conjunctivitis, and opacity of the cornea. Other herds rapidly became infected until every bovine in the island of St. Kitts, B.W.I., was affected. Treatment was palliative and symptoms subsided in 10–14 days. Since that outbreak (20 years ago) a few cases have been noticed every year.—R. FISHER.

TISCHHAUSER, L. A. (1940). **Shipping Fever of Cattle. Epinephrin to Prevent Shock Following Vaccination with Pulmonary Bacterin.**—*N. Amer. Vet.* **21.** 727–728.

In order to prevent losses from shock and allergic reactions following the prophylactic vaccination of cattle with pulmonary bacterins against shipping fever, it is recommended that 1 oz. of epinephrin should be added to every 250 c.c. of bacterin. Epinephrin, being a vasoconstrictor, raises the blood pressure, slows up absorption of the bacterin and so prevents shock.—R. FISHER.

PECK, E. F. (1940). **Ulcerative Stomatitis of Camels.**—*Vet. Rec.* **52.** 602–603. 2 figs.

A case of ulcerative stomatitis, which appears to be uncommon in camels, is described. The lesions were very shallow, circular or oval brick-red ulcers of about the size of a two shilling piece. A small amount of discharge exuded from the surface. At the periphery was a slightly raised rim of hardened brown scar tissue, while in the centre of some was a cornefied tag which somewhat resembled a buccal papilla. The animal was negative to Bennett's test for trypanosomiasis. Scrapings revealed no marked characteristics and few bacteria.—R. FISHER.

JONES, B. F., & STEWART, H. L. (1939). **Chronic Ulcerative Cecitis in the Rat.**—*Publ. Hlth Rep., Wash.* **54.** 172–175. [4 refs.]

A naturally-occurring ulcerative caecitis associated with enlargment of the adjacent lymph nodes and with peritoneal adhesions occurred spontaneously in laboratory colonies of rats. The incidence of the disease in the affected rat colonies was usually very high, 5–10% in some and up to 80% in others. The disease is briefly described. The cause has not yet been elucidated.

CORDY, D. R. (1940). **Canine Encephalomyelitis.**—*Thesis, Cornell.* pp. 76. 1 table. [Numerous refs.]

Most cases of non-rabid, non-suppurative encephalomyelitis in the dog have usually been attributed to dog distemper. In recent years, there has been reason to suspect the existence of other nervous disease entities.

This thesis is the report of a comparative study of 54 cases of non-suppurative, non-rabid encephalomyelitis in dogs, with some contributory, incidental studies on other phases of distemper. These cases are classified into four principal groups on the basis of neuropathology, symptomatology, host age, and probable aetiology.

Evidence is presented to prove that there is a disseminated encephalomyelitis in dogs distinct from distemper. Possible causative factors are discussed, but no evidence is given to support their relationship to the disease. The presence of inclusions indicates a virus origin, but the specific virus of distemper seems

excluded by several findings. This group was characterized by widespread and marked perivascular infiltration, by persistent disturbances of locomotion and vision, and by dullness or a " dummy " state.

Reasons are given for the belief that the nervous symptoms are actually a part of distemper, and that the term " post-distemper encephalomyelitis " is not valid.—H. L. G.

Liégeois, F., & Hanozet, G. (1939). Myopathie myoglobinurique enzootique ou insidieuse du cheval. **[Enzootic or Insidious Myoglobinuric Myopathia in the Horse].**—*Ann. Méd. vét.* **84.** 497–502. [2 refs.]

A discussion of the equine haemoglobinurias or myoglobinurias with a case record of what is called insidious myoglobinuria in a colt, which died with symptoms of intoxication soon after castration, the animal being in poor condition from helminthic intoxication of long standing. The urine was chocolate coloured and the muscles of mastication were swollen and tender. After natural death the latter condition proved histologically to be a Zenker degeneration. Other muscles were not examined.—J. E.

Strong, K. C. (1940). **Plastic Studies in Abnormal Renal Architecture. V. The Parenchymal Alterations in Experimental Hydronephrosis.**—*Arch. Path.* **29.** 77–119. 54 figs., 1 table. [Numerous refs.]

Following ligation of the left ureter rabbits were killed at intervals of from 1–231 days and their kidneys examined by microdissection, for evidence of hydronephrotic changes. Microscopic sections were also examined, but with microdissection it was possible to demonstrate structural continuity and topographical relations, factors which are shown to be of great importance in such a study. For example, the break in the continuity of the nephron is shown in its true perspective. Further, by grouping experimental evidence, the outline of a renal section typical of each period was traced.

As the condition progressed the distal convoluted tubules, collecting tubules and papillary duct were found to be distended and even cystic, while Henle's loop and the proximal tubules were reduced in volume and soon became indistinguishable. In as much as the proximal tubules form the chief bulk of the organ their rapid atrophy is a factor of the greatest importance in facilitating the accumulation of pelvic fluid and in determining the architecture of the hydronephrotic kidney. The accumulation of pelvic fluid was not great to begin with but rose sharply at about 4–6 weeks, later decreasing in volume. Glomerular dilatation was not observed; indeed atrophied but distinct glomeruli near distended collecting tubules were a constant feature. The presence of blood in the collecting tubules, the origin of which has often been disputed, is attributed to backflow.—C. W. Ottaway.

I. Greig, J. R. (1940). **Scrapie.**—*Trans. Highl. agric. Soc. Scot.* **52.** 71–90. 2 figs. [Numerous refs.]

II. Greig, J. R. (1940). **Scrapie. Observations on the Transmission of the Disease by Mediate Contact.**—*Vet. J.* **96.** 203–206. [4 refs.]

I. This article is a general account of the disease. It is a neurosis characterized by intense and progressive pruritus, increasing debility, and locomotor incoordination. The course may be protracted and its outcome is almost invariably fatal. It is due to an infective causal agent of whose nature little is known. The period of incubation is prolonged and may be as long as two years. Evidence suggests that under natural conditions the disease may be transmitted congenitally and also by infected pasture. It may be transmitted by artificial inoculation. G. believes that many sheep become infected without showing symptoms, and that such sheep may transmit the infection to their progeny. This tendency to latency in the individual and through one or more generations has been responsible for much of the confusion in the knowledge of scrapie.

II. An attempt was made to transmit scrapie through the medium of pasture. A double-fenced half acre enclosure was erected for scrapie sheep. In an adjoining field were placed 26 sheep obtained from farms where the disease was unknown. Twice a week the two lots of sheep were interchanged, care being taken that they did not come into contact during the change. This arrangement lasted for three years, the exposed flock being 18 in number by this time. No cases had then developed. The flock was then removed to a " clean " farm. Between February 1936 and May 1938 ten sheep developed scrapie, that is to say, after over three years and three months from the commencement of the experiment. Brief details are given of each case.—D. L. H.

BOLEY, L. E., & GRAHAM, R. (1939). **Poultry Mortality.**—*J. Amer. vet. med. Ass.* **95.** 545–550. 9 tables. [7 refs.] [Authors' summary copied *verbatim*].

Mortality studies were made on one flock of approximately 1,500 hens and pullets over a period of four years. Sick and dead birds were autopsied daily with microscopic, histopathological and bacteriological examinations supplementing some of the autopsies. Losses in the flock were recorded (figures = per cent): 1934–35, 37·87; 1935–36, 22·2; 1936–37, 27·04; and 1937–38, 47·099. In the flock studied it appears that leucemia and internal parasites are the important factors in the mortality. The incidence of leucemia as observed at autopsy increased from 25 per cent in 1934–35 to 53·1 per cent in 1937–38. Seventy-eight per cent of the total mortality occurred in the pullets of the flock during the year 1937–38, while 79 per cent of the lesions of leucemia were observed in the pullets.

A classification of the disease entities diagnosed in 15,234 poultry specimens submitted to the division of animal pathology and hygiene, University of Illinois, over a period of 7½ years is recorded.

GLOVER, R. E. (1940). **Fowl Paralysis. Transmission of Infective Agent to Young Chickens.**—*Vet. J.* **96.** 427–437. 4 tables. [11 refs.]

G. refers to previous transmission tests of fowl paralysis [BLAKEMORE (1939) & DALLING (1939)] in which it was found necessary to use very young chicks of a susceptible strain, the disease produced being focal necrosis of the liver, effusion into the pericardial sac, and infiltration of the myocardium. Using a turkey strain [*V. B.* **10.** 364.] G. passaged the virus through 16 groups of Black Leghorn [B.L.] chicks from 3–16 days old by intraperitoneal, intravenous, intramuscular, intracranial and intranasal injections. The first passages, usually made every three weeks, caused mild disease but the lesions became more marked later in the series. Only 14 out of 198 chicks died. None of the control chicks (all from stock in which selective breeding had apparently eliminated the disease) developed symptoms and normal turkey tissues also proved non-pathogenic. A comparison of lesions set up by the Cambridge strain of fowl paralysis in B.L. and Plymouth Rock chicks with those caused by the turkey strain confirmed that these chicks were less susceptible than those used in the Cambridge tests. The histology of the lesions is detailed. Organs of the chicks remained infective from the 12th to the 132nd day after infection. Drying the virus in liver tissue and storing in buffered 50% glycerol conserved infectivity for 135 and 28 days respectively. No demonstrable antibodies could be found in sera of chicks infected eight weeks previously nor were attempts at vaccination of four-day-old chicks with formolized tissue virus successful. BLAKEMORE'S suggestion that the first effect of the virus is an acute disease with inflammatory lesions is confirmed by the present study.—C. V. WATKINS.

FRASER, W. A. Carr. (1938). **"Unthriftiness" in Livestock. A Preliminary Report.**—*Circ. West Dist. Res. Ass., Victoria.* No. 5. pp. 10. 6 tables, 2 graphs.

F. describes the type of mortality affecting lambs born on sheep farms in western Victoria and the results of a questionnaire sent to 16 sheep farmers. The average mortality was 5·5% in lambs occurring between "marking" (at about five weeks of age) and weaning (at 4½ months of age), and 10·5% between weaning and second shearing (at 15–18 months of age).

Two experiments to determine the value of various mineral licks in preventing losses gave negative results, so that the cause of the condition remained obscure. The worm burden of the lambs was considerable but not enough to account for the losses.—J. E.

TODD, T. W., WHARTON, R. E., & TODD, A. W. (1938). **The Effect of Thyroid Deficiency upon Bodily Growth and Skeletal Maturation in the Sheep.**—*Amer. J. Anat.* **63.** 37–78. 3 figs., 13 tables, 2 charts, 2 graphs. [Numerous refs.]

The effect of thyroidectomy in early postnatal life was assessed by a study of the skeletons and skulls of five pairs of twin sheep, one of each pair being thyroidectomized. The general results were deficient growth and modelling of the epiphyses themselves, defective development of age characters on both epiphysis and adjacent shaft and diminished velocity of growth of shaft. No modification of bone texture, weight, thickness, or modelling of shaft occurred nor any prolongation of the growth period to compensate for the diminished velocity of growth. From this it appears that a disturbance of developmental growth occurs which is localized in the epiphysis and the diaphyso-epiphysial plane causing a slowing

but not a prolongation of developmental growth. As there is no prolongation of the growth period, a reduction in the proportions of the limbs results, comparable to those of the unimproved wild sheep of little meat or wool value.

Thyroidectomy reduces the velocity of maturation by approximately one half. No obvious pathological changes were evident in the diaphyso-ephiphysial plane until the animal was two or more years old. The disturbance of developmental growth in the skull was most marked in the premaxilla and maxilla but also affected other parts of the face.

It is concluded that this study has a profound significance in the elucidation of growth patterns upon which breeds of sheep are based.—R. A.

NIEBERLE, K. (1940). Ueber Folgen der Periarteriitis nodosa. **[The Sequelae of Periarteriitis Nodosa].**—*Arch. wiss. prakt. Tierheilk.* **76.** 47–50. 2 figs.

Periarteriitis nodosa is a necrotic inflammation of the wall of an artery, followed by a reparative process which gives a characteristic appearance to the vessel. In an advanced case the artery is transformed into a thick knotty cord. The coronary arteries and interlobular arteries of the kidney are the commonest sites, though the intestinal arteries have also been found affected.

A case affecting the heart, spleen, kidneys, large intestine and omentum of a nine-month-old slaughter pig is described and illustrated by two photomicrographs.

The sequelae of periarteriitis nodosa are in conformity with the hindrance to local blood supply and include infarction, local ischaemia, and loss of function of the organ concerned. —J. E.

I. CAULLERY, M. (1939). L'hérédité pathologique considérée du point de vue de la biologie générale. **[Pathological Heredity from the Point of View of General Biology].**—*IV Congr. int. Pat. comp., 1939.* **1.** 127–154. [Numerous refs.] [In French: English, French, German, Italian and Spanish summaries].

II. CREW, F. A. E. (1939). **Comparative Genetics in Its Relation to Comparative Pathology.**—*Ibid.* 211–225. [In English: French, German, Italian and Spanish summaries].

III. MOHR, O. L. (1939). **Lethal Genes in Higher Animals and Man.**—*Ibid.* 247–263. 18 figs. [13 refs.] [In English: French, German, Italian and Spanish summaries].

I. A review in general terms of the relationship between hereditary abnormalities and the principles of genetics and the facts of experimental biology. C. briefly summarizes advances in the knowledge of the mechanism of heredity which have been made possible by the study of certain mutations, most of those dealt with being of a pathological nature. Of particular importance from the pathological aspect are the known facts concerning lethal and sublethal genes. C. points out that since hormones exercise a directing function in morphogenesis, endocrine pathology must be of great interest in the study of hereditary abnormalities. Facts taken from the field of biology are discussed in their relation to racial constitution in domestic animals; intersexuality and other questions of sexual pathology are mentioned. The possible relationship of heredity and resistance to infectious diseases and to cancer is briefly dealt with.

II. C. classifies the causes of disease as environmental and genetic, and points out that veterinary science so far has been concerned almost entirely with the prevention of diseases of environmental origin. He stresses the importance of hereditary diseases and defects, and discusses suitable methods for the recognition in the large domestic animals of individuals which carry pathological mutant genes, the possession of which renders it desirable that they should not be used for breeding. The results of systematic inbreeding with domestic animals so far obtained point directly to the conclusion that in all probability modern livestock is heavily loaded with recessive genes corresponding to pathological characters, and C. states that, in view of the considerable financial losses incurred, it might be sound policy to purge the constitutions of our animal stocks of such characters. Such a procedure could not be adopted by the individual breeder of livestock, but C. thinks that it might be profitably undertaken by the State.

III. A survey of the mode of action of lethal and sublethal genes illustrated by a considerable series of cases from the larger domesticated animals and from the smaller laboratory vertebrates. Excellent photographs from various sources depict lethal defects and monstrosities in various species. Mutant genes

which produce pronounced character changes generally have an adverse effect on the viability, frequently causing the death of the individual during the developmental stages. Such genes are known as lethal genes; if death occurs not before but shortly after birth they are denoted as sublethal genes. M. points out that in the animal kingdom all the lethal genes are so-called zygotic lethals, killing the diploid individual when homozygous. Attention is drawn to the numerous cases of parallel mutations, lethal defects, and monstrosities of a similar nature occurring in related species. —N. J. Scorgie.

Ely, F., Hull, F. E., & Morrison, H. B. (1939). **Agnathia, A New Bovine Lethal.**—*J. Hered.* **30.** 105–108. 1 text-fig., 4 figs. on 1 plate. [10 refs.]

Agnathia, defined as "absence or imperfect development of the jaws", was encountered in four male Jersey foetuses. Three cases occurred within the Kentucky Agricultural Experiment Station herd, which is abortion-free and of which careful breeding records have been kept for over 30 years, while the fourth case was sired by the son of a bull from the Station herd. One of the calves was carried to full term and was of normal size; its lower jaw was 8 cm. shorter than the upper, while the mandibular space was filled with an irregular mass of osseous, soft, and dental tissues which extended dorsally until it almost obliterated the pharynx. The lower lip did not extend anteriorly to the first upper premolar. On each side of the head, midway between the base of the ear and the angle of the jaw, was a wattle-like appendage.

Genetic analysis of the four cases indicated that the agnathic character was inherited as a recessive, and was limited to bull calves. Two bulls in the Station herd were incriminated as being heterozygous for the defect.—A. N. W.

Letard, E. (1939). Le brachygnathisme inférieur chez les animaux domestiques et chez l'homme. [**Brachygnathism of the Lower Jaw in Domestic Animals and Man**].—*Rec. Méd. vét.* **115.** 577–594. 5 figs. [11 refs.]

L. describes several cases of brachygnathism of the lower jaw which he has encountered in dogs. Reference is also made to the occurrence of this deformity in other species of domestic animals. It is stated that the deformity has been frequently noted in horses in a certain district of central France. It appears clear that brachygnathism is hereditary in all species, and that the condition is recessive.—N. J. S.

Eaton, O. N., & Simmons, V. L. (1939). **Hermaphrodism in Milk Goats.**—*J. Hered.* **30.** 261–266. 2 figs., 5 tables. [9 refs.]

Hermaphrodism or intersexuality is stated to occur more frequently in the goat than in any other farm animals. An analysis was made of all cases of true hermaphrodism occurring between the years 1925–1938 in the mixed herd of Toggenburg and Saanen goats maintained at Beltsville, Md., by the United States Department of Agriculture. The number born at each parturition, and the sex, birth weight, mortality, and lineal descent of each case was noted. The hermaphrodite kids born during 1938 were slaughtered at ten days of age and subjected to a detailed anatomical study.

In all, 38 of 343 Saanen, and 21 of 350 Toggenburg kids were hermaphrodites. Certain matings consistently produced hermaphroditic kids. There was no evidence that the viability or birth weight of such kids differed from that of normal kids, nor was there found to be any relation between type of birth (singles, twins, etc.) and hermaphrodism. The data strongly suggested that hermaphrodism is inherited as a single recessive factor; elimination from a herd of animals which produce hermaphroditic kids would therefore do much towards checking the abnormality.—A. N. W.

Greene, L. F., & Feldman, W. H. (1940). **Cystitis Follicularis in a Dog.**—*Arch. Path.* **29.** 511–516. 2 figs. [5 refs.]

A description is given of cystitis follicularis in an adult bitch. The condition is extremely rare in dogs but more commonly found in human beings where it is characterized by the presence of true lymph follicles in the mucosa and submucosa of the urinary bladder which differ in no way from the solitary follicles occurring in the intestine.

The bitch seemed in good health, the condition being discovered only during the performance of cystoscopy for experimental purposes. Over 60 dogs similarly examined showed no signs of the condition. In addition to syphilis, gonorrhoea, and typhoid fever, tuberculosis is recognized as a cause of the condition in man, but there was no evidence of TB. in this case. Both kidneys showed extensive fibrotic changes but these were not

regarded as being associated with the lesions in the bladder. *Bacterium coli* was present in the urine.—H. V. HUGHES.

SMITH, S. E. (1939). **Functional Sterility in Dairy Cows.**—*Thesis, Cornell.* pp. 77. 11 tables. [Numerous refs.]

In cows and heifers with functional sterility, eight out of 16 (50%) conceived, following treatment with Progynon-B (oestradiol-benzoate) or anterior pituitary gonadotrophic hormone after an average of 2·4 services per conception. Four out of ten (40%) controls conceived with an average of 1·5 services per conception. The injection of 20,000 R.U. of Progynon-B per cow under clinical conditions was followed by conception in 14 out of 16 (88%) cows with functional sterility. In four of the 16 cows and heifers that received 20,000, 30,000, 50,000, and 60,000 R.U. of Progynon-B there was induced an artificial oestrus. In seven of the animals, oestrus followed within five days after Progynon-B injections but it is questionable if this can be attributed to the treatment. The remaining five cows were refractory to 20,000 R.U. as far as induced oestrus was concerned. The injection of 400 R.U. of pituitary gonadotropic hormone into each of two cows was followed by a great increase in ovarian size. The enlarged ovaries had a highly lobulated surface as palpated *per rectum*.

The vaginal mucus of six of these cows averaged pH 8·0 with a range of 6·9–8·6. Three of the cows had vaginitis and in three the vagina appeared normal. In five of these cows there was a decrease in pH from about 8·0 to 7·2 at 1–4 days post-oestrus. The pH of the vagina in one cow dropped from about 8·2 to 7·2 after the administration of 70,000 R.U. of Progynon-B over a period of nine days. There was no detectable abnormal variation in the blood composition of 12 of these sterile cows as far as Ca, glucose, inorganic P, lipoid P, total cholesterol, and haemoglobin were concerned.

Bull semen is well buffered and compares well with blood serum. It differs from blood serum in being relatively less buffered over the range of pH 6·5–9·0. Semen is relatively highly buffered at about pH 4·0–10·0.—H. L. GILMAN.

FUERSTNER, P. G., & SARGENT, F. (1940). **The Meteorotropism of Eclampsia.**—*J. Lab. clin. Med.* **25.** 779–788. 6 figs. [14 refs.]

A study of the association between weather changes and the precipitation of convulsions in 46 patients suffering from eclampsia was carried out in Chicago. The evidence presented indicates that the highest percentage of cases was distinctly correlated with infalls of cold air or the passing of a cold front, and the highest number of onsets occurred within 40–50 hours after the invasion of cold air. It is not claimed that the weather has any aetiological significance with regard to the disease itself, but it is thought that sudden changes in the physical *milieu* may produce disturbances in the autonomic nervous system which can be counterbalanced by the normal healthy organism, but which may precipitate convulsions in a patient suffering with a pregnancy toxaemia where a severe metabolic disturbance exists. —R. ALLCROFT.

FOWWEATHER, F. S., DAVIDSON, C. L., & ELLIS, L. (1940). **Spontaneous Hyperventilation Tetany.**—*Brit. med. J.* Sept. 21st. 373–376. [12 refs.]

Five cases of hyperventilation tetany in women are recorded. Blood samples taken at the end of the attacks showed a rise in serum calcium and a fall in serum inorganic phosphorus in comparison to samples taken while the patients were in an attack-free period. A parallel fall in urinary phosphorus also occurred.

Hyperventilation tetany can be produced experimentally by voluntary overbreathing. It is believed to be due to tissue alkalosis as the result of excess loss of CO_2 by the lungs and consequent disturbance of the acid-base equilibrium of the blood. The fall of inorganic phosphorus in the serum and urine in these cases indicates an uptake of phosphorus by the tissues.—A. T. PHILLIPSON.

LITTLE, C. C., MURRAY, W. S., & CLOUDMAN, A. M. (1939). **The Genetics of Non-Epithelial Tumor Formation in Mice.** —*Amer. J. Cancer.* **36.** 431–450. 14 tables. [6 refs.] [Authors' conclusions copied *verbatim*].

1. The genetics of non-epithelial tumor formation in mice is not the same as that of mammary gland tumors. 2. No simple mendelian phenomena are discernible. 3. If any type of mendelism is involved, it includes multiple factors and marked influence of the internal environment. 4. In determining the absolute incidence of non-epithelial tumors among hybrid animals, there seems to be, in the material observed, approximately equal influence of male and female parents. 5. In

determining the type of non-epithelial tumor, *i.e.* the type of tissue and cell affected, there is some slight indication that the maternal ancestor may be more influential. 6. The determination of *location* of the non-epithelial tumor in hybrids appears to be equally affected by each parent. 7. The great increase among hybrids in uterine sarcomas and in non-epithelial tumors of the mammary region suggests the possibility that imbalance of ovarian and/or some other endocrine function may be an important etiologic factor in these tumors. 8. Preliminary evidence suggests that a possible relationship may exist between dilute pigmentation (d) [refers to the genetics of the mice] and increased non-epithelial tumor formation. This, if confirmed by more extensive data, would probably be an indication of some physiological factor rather than anything in the nature of genetic linkage.

LIPSCHÜTZ, A., & VARGAS, L., Jr. (1939). **Experimental Tumorigenesis with Subcutaneous Tablets of Oestradiol.**—*Lancet.* **236.** 1313–1318. 12 figs., 2 tables. [17 refs.]

Uterine and extra-uterine tumours can be produced in the g. pig by the subcutaneous implantation of a tablet of oestradiol. These tumours are similar to the uterine and extra-uterine fibroids and fibro-myomata produced previously by a long course of injections of various oestrogens. The uterine tumours begin to appear as early as 2½–3 weeks after the introduction of the tablet, and uterine bleeding can also appear at this early date; in about seven weeks a high degree of tumorigenesis may be attained, much greater than with injections of free oestradiol.—J. M. ROBSON.

MERCIER, L. (1939). Essai sur l'hérédité du cancer chez la souris. **[Inheritance of Cancer in Mice].**—*Acad. nat. Sci., Caen.* **9.** Reprint pp. 24. 1 appendix. [3 refs.]

M. has studied for the past ten years a spontaneous lymphosarcoma of mice. By careful selection it was possible to produce a cancerous and a non-cancerous strain. The former consisted of 465 mice, of which 237 developed tumours. The sex incidence was approximately one cancerous male to two cancerous females. Crossing of mice from the cancerous strain gave an incidence of lymphosarcoma among the progeny which was always approximately 50%, no matter whether the male or female used for mating was affected with neoplasia or not.

Crossing mice of the cancerous strain with those of the non-cancerous strain produced an F1 generation free from tumours. In the F2 generation there were 11 cases of lymphosarcoma among 98 mice.

M. advances the hypothesis of a genetic factor consisting of a combination of cytoplasmic and chromosomal components.—E. G. W.

GAVRILOV, W., & FESTER, A. (1939). Quelques propriétés du virus de sarcome Rous. **[Some Properties of the Fowl Sarcoma Virus].**—*Arch. ges. Virusforsch.* **1.** 104–113. 3 figs. [16 refs.] [In French]. [Translation of authors' conclusions].

1. Rous sarcoma virus can be grown, according to the method of Fischer, in culture medium to which chicken embryo heart has been added. 2. Multiplication of the filtered virus can be obtained by culture in chicken embryo heart. 3. Injection of filtered or unfiltered virus evokes an immediate histiocytic reaction which can develop into a true tumour.

4. If the amount of virus injected is insufficient a tumour does not develop, and after such a dose there may be regression of an existent tumour. 5. Living cells are necessary for the development of the virus; nevertheless the virus may remain in the body of the host without producing a tumour at the site of inoculation. A tumour may, however, develop elsewhere. 6. It is suggested that the virus is a biological organism which produces in a cell very varied, even crystalline, substances.

7. The transplanted tumour does not give 100% positive results.

8. It appears that the potency of the virus varies according to the resistance of the host (fowl) or according to the extent of its attenuation by passage in culture media.

FRIEDEWALD, W. F. (1939). **Identity of "Inhibitor" and Antibody in Extracts of Virus-Induced Rabbit Papillomas.**—*Proc. Soc. exp. Biol., N.Y.* **42.** 330–332. [7 refs.]

Saline extracts of the virus-induced papillomas of domestic rabbits often contain an agent which inhibits or neutralizes the virus *in vitro*. Experiments were carried out to determine whether this "inhibitor" was identical with specific antiviral antibody as found in the blood. It was found that the amount of "inhibitor" which could be extracted from the tumours in any particular animal was proportional to the amount of circulating antibody at any given

time, and also that increased production of humoral antibody brought about by intraperitoneal injections of virus resulted in an increase in the amount of inhibitory substance. Neither the "inhibitor" nor the antiviral antibody exerts any influence on the course of the tumours. It is concluded that the two substances are identical.—E. G. WHITE.

NUTRITION IN RELATION TO DISEASE

BATT, H. T. (1938). **Carbohydrate Metabolism Studies in the Domestic Fowl. I. Variations in the Fasting Blood Sugar Level.**—*Thesis, Cornell.* pp. 100. 17 tables. [Numerous refs.]

BATT, H. T. (1940). **Carbohydrate Metabolism Studies in the Domestic Fowl. II. The Response of the Blood Level to the Ingestion of Glucose. III. The Ascending Glucose Renal Threshold.**—*Thesis, Cornell.* pp. 137. 38 tables. [Numerous refs.]

I. One of a series of studies on the carbohydrate metabolism of the domestic fowl. This report deals with the results of a study concerning the normal range of the blood sugar level under various physiological conditions.

For this work 37 healthy fowls varying in age from six months to four years, and representing three breeds and both sexes, were used. The blood sugar estimation, by means of the Folin (1928) micro technique, was begun as soon as the blood had been removed by venous puncture from a wing vein, no anticoagulant being used.

866 determinations of the blood sugar level on birds fasted for 24 hours revealed a range of from 130–290 mg. of blood sugar per 100 c.c. of whole blood; 57·6% of the values were between 170–200 mg., and 75·6% between 160–210 mg. per 100 c.c.

The values obtained were analysed to determine the effect, if any, of breed, age, sex, egg production, season of year, and the time of day at which the samples were taken. Of the conditions studied, age alone seems to exert a significant effect. Immature birds tend to have a higher fasting blood sugar level than adults.

II & III. The work is based on the results of 10,340 blood sugar estimations on 108 domestic fowls, together with the results of 657 qualitative Benedict's tests on voided excreta and intestinal contents.

The glucose tolerance curve of the domestic fowl would seem to be like that of the mammal in form. The only differences are that it requires more glucose and a longer time to elicit the maximum response and to recover therefrom.

It appears that the ascending renal threshold for glucose in the domestic fowl lies somewhere between 275 and 300 mg. of glucose per 100 c.c. of blood.

The blood sugar response to the ingestion of glucose is not affected by breed and shows no difference between the sexes, nor is it affected by egg laying. The blood sugar level of the bird fasted for 24 hours is maintained at a relatively steady level for at least five hours. Ingestion of water had little effect on the blood sugar level. Maximum blood sugar response to the ingestion of glucose results from an intake of 8 g. or more per kg. body weight. Expressed as percentage of the pre-feeding level of glucose it is 176·7 ±4·9 mg. per 100 c.c. of blood. The time taken for the disappearance of the blood sugar response to the ingestion of glucose is directly proportional to the amount of sugar ingested. The blood sugar response to the ingestion of glucose decreases as the molarity of the solution used increases. The excreta of the fasted bird do not reduce the usual qualitative reagents.—H. L. GILMAN.

BROUWER, E., & DIJKSTRA, N. D. (1938). **On Alimentary Acetonuria and Ketonuria in Dairy Cattle Induced by Feeding Grass Silage of the Butyric Acid Type.**—*J. agric. Sci.* **28.** 695–700. 2 tables. [13 refs.]

The analysis of the urine of milch cows fed on large quantities of butyric type silage (1·7–2% butyric acid) showed acetone bodies, but there was no evidence of acidosis nor any clinical symptoms. Controls were given grass hay. On reversing the diets of the groups the urine changed correspondingly the next day. The acetonuria was found to appear at, and last for a definite time after, feeding. The same degree of acetonuria was produced by feeding a lactic acid silage to one animal. The explanation of this non-clinical alimentary acetonuria is discussed.—E. I. MCDOUGALL.

SCHMIDT, H. (1940). **Calcium and Phosphorus Deficiencies in Cattle and Horses.**

Clinical Picture, Treatment and Prevention.—*J. Amer. vet. med. Ass.* **96.** 441–458. 5 tables, 1 graph. [Numerous refs.]

A review of the work of the last 15 years on the deficiencies and imbalance of these elements, particularly on 'loin disease' in cattle and osteodystrophia fibrosa in the horse.

—E. I. McDougall.

Sjöberg, K. (1939). Några biokemiska iakttagelser i samband med kalk- och fosforbrist hos hundvalpar. [**Research on Calcium and Phosphorus Deficiency in Puppies**].—*Skand. VetTidskr.* **29.** 54–73. 7 figs., 7 tables. [14 refs.] [English summary].

Estimations of the plasma and corpuscular inorganic P, plasma phosphatase and corpuscular acid-soluble P were made on the blood of puppies fed on diets variously deficient in Ca or P. The experiments were made on healthy Great Danes from the age of 60 days.

Signs of rickets developed in the puppies which were given 0·77 g. Ca and 0·6 g. P per day, but did not appear in those given in addition cod liver oil plus bone meal or Ca lactate. In the rachitic animals there was a decrease to half the normal amount in plasma and corpuscular inorganic P and a great increase in plasma phosphatase; normal levels were rapidly attained after a single intravenous injection of vitamin D, or vitamins A and D. A discussion of the theory of phosphatase function is given.—J. E.

Wiese, A. C., Johnson, B. C., Elvehjem, C. A., & Hart, E. B. (1938). **Phosphorus Metabolism of Chicks Afflicted with Perosis.**—*Science.* **88.** 383–384. [8 refs.]

An investigation of the P distribution in the blood of normal birds and those affected with perosis showed that the inorganic P remained constant in both at a level of approximately 4·7–5·6 mg. per 100 c.c. blood. The ester P was 26–30 mg. % in perosis birds while the total P ranged from 100–141 mg. %. In normal birds the ester P was 32–44 mg. % and the total P varied from 100–132 mg. % showing that the ester P was higher in normal birds. The phosphatase content of blood and bone was also higher in the normal birds.

It was thought that inositol may be concerned with the higher ester P level observed in normal birds compared with that in perosis birds. When chicks receiving a perosis-producing ration supplemented with manganese in insufficient quantity to prevent perosis, were injected with 100 mg. of inositol per week, complete protection against perosis was obtained and the ester P and blood phosphatase rose to normal values. It is suggested that the injection of adequate Mn, or inadequate Mn plus inositol, may result in the formation of inositol esters of phosphoric acid but no proof of this has so far been obtained.—R. Allcroft.

Eveleth, D. F., Eveleth, M. W., & Walsh, F. E. (1940). **Hyperphosphoremia, Hypocalcemia in Dairy Calves.**—*Vet. Med.* **35.** 226–227. 2 tables. [4 refs.]

Calves, receiving 15 lb. of whole milk daily up to six months of age, and a ration of cereals, oil cake, and alfalfa hay with access to sunshine and pasture almost daily, developed a skeletal disease clinically similar to rickets. Serum Ca was slightly low but serum inorganic P was definitely high in contrast to the usual picture in avitaminosis-D. Addition of $CaCO_3$ to the ration prevented the development of further cases and maintained the serum constituents at normal levels. Evidently the diet was deficient in Ca but no data are given for Ca intake. Treatment of two badly deformed calves with cod liver oil, ultra-violet light and supplementary Ca failed to correct the bone deformities, although the blood picture was restored to normal. At maturity, the animals were sterile or unsatisfactory breeders. The observations illustrate the influence of the nutrition of the calf upon its breeding and productive capacity as an adult.—W. R. Muir.

Johnson, D. W., Palmer, L. S., & Nelson, J. W. (1940). **Failure of Dietary Magnesium Imbalance to Produce Urinary Calculi in Wethers.**—*Vet. Med.* **35.** 353–357. 1 fig., 3 tables. [Num. refs.]

Approximately 10% of a flock of 2,600 wether lambs were affected with urinary calculi during the winter period when they were maintained on a diet of sweet clover screenings, sweet corn silage, yellow maize, linseed meal, salt, and beet tops. Analysis of the feeds suggested that the Mg content of the ration was relatively high compared with the Ca and P contents. A stone from one of the wethers consisted chiefly of $MgNH_4PO_4$.

Investigations were conducted on 20 wethers in two groups; group I was fed $MgCO_3$ equivalent to the Mg of the beet tops (1·5% of

the dry matter); group II the same quantity of $MgCO_3$ with added $CaCO_3$ to give a Mg : Ca ratio of 3 : 4. The rations were fed for 154 days and composite blood samples of two or three consecutive days were taken at the beginning, after 60–70 days, and again at the end of the experiments, the plasma being analysed for Ca, P and Mg. Urine samples taken periodically were examined for pH and crystal formation. No symptoms of urinary calculi occurred and at P.M. careful examination of the urinary tracts showed stones in only two of the lambs, one from each group. The plasma Mg showed some remarkable changes, rising in group I from an initial mean of 2·7 up to 9·0 mg. %, and in group II from 2·5–7·4 mg. %. Despite this no calculi were produced. Changes in plasma Ca and P were not as marked.

[In so far as the blood changes are concerned the results will not find general acceptance without careful confirmation. The rise in serum Mg from a normal value of 2·7 mg. % to 9·0 mg. % is difficult to credit in view of the known constancy of blood magnesium under widely varying conditions of feeding and management. Other observers [*V. B.* **7**. 398.] have reported only small increases in the case of sheep after supplying dolomite in the food or magnesium sulphate in the drinking water, and numerous analyses of the blood of grazing ruminants in various parts of the world indicate remarkable constancy of composition despite wide variations in Mg content of pasture].

—A. Eden.

Davis, G. K., Freeman, V. A., & Madsen, L. L. (1940). **The Relation of Nutrition to the Development of Necrotic Enteritis in Swine.**—*Tech. Bull. Mich. agric. Exp. Sta.* No. 170. pp. 28. 6 figs., 4 tables. [17 refs.]

During the course of experiments initially undertaken to determine the effect of feeding singly any of the following cereals, barley, yellow maize, wheat, or oats, upon carcass quality, numerous animals became affected with digestive disorders. The cereals were supplemented with buttermilk, a salt mixture, and either carotene or cod liver oil as a source of vitamin A. Equalization of protein intake by the feeding of further supplements was effected in later experiments of the series.

The first and most serious cases of illness occurred in the groups receiving maize; diarrhoea was prevalent, there was a varying degree of anaemia, and there were several deaths. P.M. examinations revealed typical lesions of a necrotic enteritis. The remaining affected animals appeared ravenous, and dashed to their troughs at feeding time, but would eat little of the proffered food. Various supplements were offered, and of these fresh liver was readily taken and led to a fairly rapid return to a normal condition. Dried yeast and liver meal were effective also, but to a lesser degree. In later experiments, affected animals were given nicotinic acid *per os* as a powder or as a 1 % aqueous solution, in amounts varying from 60–200 mg. per day; as in the cases reported by Chick and her co-workers [*V. B.* **9**. 269.] prompt recoveries occurred. Attempts were then made to demonstrate the prophylactic value of nicotinic acid, and from experiments upon 32 animals and upon five groups receiving varying levels, it was concluded that at least 100 mg. of nicotinic acid daily are necessary to prevent the development of necrotic enteritis in young pigs receiving a diet consisting largely of maize. A further 40 animals receiving diets of any one of these cereals were given 100 mg. nicotinic acid daily and allowed to come into contact with pens previously used by affected pigs; no cases of necrotic enteritis occurred. [This procedure did not provide, as is claimed, every attempt to ensure opportunity for infection, particularly so as the previous cases were presumably of nutritional origin. The bacterial data recorded are very scanty.] A few attempts to treat field cases of necrotic enteritis with nicotinic acid are recorded, and in some instances success is claimed.

[These findings appear to have attracted a great deal of attention in the U.S.A., where they have been widely quoted in veterinary and agricultural literature. Whereas they provide confirmatory evidence for the fact that lesions identical with those of naturally-occurring necrotic enteritis may be set up by nicotinic acid deficiency, they do not, as the authors themselves admit, establish conclusively any direct relationship between nicotinic acid deficiency and *Salmonella suipestifer* infection. While much further work is needed to clarify the position, the balance of evidence at the moment appears to indicate that either nicotinic acid deficiency or *S. suipestifer* infection is capable of setting up the disease, and it is possible that yet other causes may provoke the same sequence of pathological changes.]—Alastair N. Worden.

HUME, E. M., BURBANK, R., & KORENCHEVSKY, V. (1939). **Some Effects of the Administration of Oestrogens on the Organs of Castrated and Non-Castrated Male Rats Partially Deprived of Vitamin A.**—*J. Path. Bact.* **49.** 291–298. 21 figs. on 5 plates, 1 table. [8 refs.]

Histological examination of the sex organs and bladders of castrated and non-castrated rats which had been subjected to prolonged partial deprivation of vitamin A, to moderate doses of oestrogens, or to both simultaneously, showed that the most severe changes occurred in castrated animals deprived of vitamin A and treated with oestrone at the same time. No cancerous changes of the epithelium were found, but stratification, papillomatosis, squamous metaplasia, and keratinization of the epithelial layer of the bladder occurred, giving in some cases a picture of leucoplakia. Severe degeneration of the testes and the formation of calculi in the bladder were changes specific for vitamin A deficiency.—R. ALLCROFT.

FOUTS, P. J., HELMER, O. M., & LEPKOVSKY, S. (1940). **Factor II Deficiency in Dogs.**—*J. Nutrit.* **19.** 393–400. 2 tables. [14 refs.]

Seven adult dogs developed a deficiency disorder characterized by loss of appetite and weight, intermittent diarrhoea, anaemia and death, when fed a synthetic casein diet supplemented with thiamin, riboflavin, nicotinic acid, and B_6. The diet was thought to be deficient only in the factor or factors, other than nicotinic acid, contained in a purified liver extract. The symptoms were similar to those produced in pigs fed a synthetic diet similarly supplemented [see *V. B.* **9.** 269]. Three short-haired dogs developed ulcers of the skin over the shoulders, neck, and back, but long- or wire-haired dogs did not develop ulceration.

It was not determined whether this deficiency disorder was due to lack of factor II (chick anti-dermatitis factor) alone, or to this and other components of the B complex not yet identified [see also *V. B.* **10.** 956].—R. A.

ARNOLD, A., & ELVEHJEM, C. A. (1940). **The Relation of the Vitamin B Complex to the Nutrition of Domestic Animals.**—*J. Amer. vet. med. Ass.* **96.** 56–61. [Numerous refs.]

Six distinct members of the vitamin B complex are now recognized, *viz*, vitamin B_1, nicotinic acid, riboflavin, vitamin B_6, pantothenic acid and factor W (filtrate factor). Information is given concerning the physiological role, the effects of dietary deficiency, the daily requirements, and the distribution in animal feeding stuffs of each of these vitamins mainly in so far as they are of significance in the nutrition of the dog, pig, chicken, and turkey. Considerable space is given to the description of the deficiency syndromes in pigs and reference is made to the report that necrotic enteritis in pigs may be cured and prevented by feeding nicotinic acid. Certain components of the B complex appear to be synthesized in adequate amounts by bacteria in the ruminant digestive tract, but the observation that digestive disturbances in horses on a diet of hay and oats were promptly alleviated by administration of 250 g. of dried yeast indicates that horses are susceptible to deficiency of the B complex in the diet.—W. R. M.

SATTERFIELD, G. H., MOSELY, M. A., GAUGER, H. C., HOLMES, A. D., & TRIPP, F. (1940). **Correlation of Avian Diseases and the Ascorbic Acid Content of Chicken Blood.**—*Poult. Sci.* **19.** 337–344. 2 tables. [4 refs.]

The ascorbic acid was determined in the plasma of 100 diseased birds of different ages, breed, sex, management, feeding and disease conditions. No significant variation or correlation with disease was found.—E. I. McD.

TITUS, H. W., & BURROWS, W. H. (1940). **Influence of Wheat Germ Oil on the Semen Production of Cockerels.**—*Poult. Sci.* **19.** 295–298. 1 fig. [8 refs.]

Investigations on semen production in 40 six-month-old cockerels over a period of 112 days showed that the feeding of desiccated thyroid caused a steady and fairly rapid reduction in the semen production which continued for several days after the feeding of thyroid was discontinued. Contrary to expectation, the addition of 0·5% of wheat germ oil to the diet also caused a pronounced decrease in the semen production; treatment of the diet with ferric chloride in ether (to destroy vitamin E) had little if any effect.

—E. I. McDOUGALL.

HOLMES, C. E., & CRAVENS, W. W. (1940). **The Effect of Feeding Wheat Germ Oil. I. Egg Production and Hatchability. II. Growth, Age to Sexual Maturity, and Egg Production.**—*Poult. Sci.* **19.** 303–310 and 311–314. 8 tables. [4 refs.]

1. Commercial advertisements have claimed that the addition of wheat germ oil to the ration

is beneficial to breeding stocks. Investigations on Single Comb White Leghorn and Barred Plymouth Rock hens showed that the addition of 0·5 ml. wheat germ oil per bird per day to a good breeder ration for over two years had no beneficial effect on fertility, hatchability, egg production, embryonic mortality, malpositions, haemorrhagic or sticky embryos, or the relative distribution of the late deads in shells.

II. Addition of 0·1% wheat germ oil to the ration had no significant effect on growth, mortality, age to sexual maturity, or egg production.—E. I. McDougall.

Jungherr, E. (1939). **Wheat Germ Oil in the Control of Fowl Paralysis and Kindred Diseases.**—*Proc. 42nd ann. Meet. U.S. Live Stk sanit. Ass., 1938.* pp. 171–181. [Numerous refs.]

The ordinary form of fowl paralysis is characterized by asymmetric paresis and a thickening of the peripheral nerves, but evidence indicates that lymphomatous tumours, similar diffuse infiltrations of the visceral glands, and frank leucaemias belong to the same group of disorders. This discussion therefore deals with these aspects and the various forms of avian leucosis [see also *V. B.* **11.** 246].

A comparison of the pathology of leucotic diseases and vitamin E deficiencies indicates that the former are characterized by autonomous proliferation of haematopoietic elements, while E deficiencies, like other avitaminoses, are primarily characterized by degenerative processes of certain body tissues such as skeletal muscular dystrophy and regressive disturbances of spermatogenesis in the testes. The only exception to this selective degeneration of E-avitaminosis is the reported occurrence of a tumour-like " lymphoblastoma " in chicks fed a ferric chloride treated diet in which E was presumably destroyed. From this J. concludes that there is no known pathologic basis for assuming a specific anti-leucotic property of wheat-germ oil. The results of experimental trials involving 60 birds demonstrated that wheat germ oil injected intramuscularly is not properly resorbed even after a period of five weeks. Administration *per os* of large doses of wheat germ oil over periods of 10–39 days did not exert any beneficial effect on 24 young birds shown to be affected with fowl paralysis. So far no detailed field observations are available as regards the efficacy of wheat germ oil in the control of this condition.—R. Allcroft.

I. Dam, H., & Glavind, J. (1939). **Alimentary Exudative Diathesis, a Consequence of E-avitaminosis. [Correspondence].**—*Nature, Lond.* **143.** 810–811. [3 refs.]

II. Bird, H. R., & Culton, T. G. (1940). **Generalized Edema in Chicks Prevented by d,l-Alpha Tocopherol.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 543–547. 1 fig., 1 table. [6 refs.]

I. A direct test of *d,l*-α-tocopherol uncombined or in the form of the acetate, demonstrated that this substance (vitamin E) would protect chicks against alimentary exudative diathesis described in a previous paper [*V. B.* **9.** 641]. This condition can be inhibited by smaller quantities of vitamin E than can encephalomalacia occurring in chicks receiving a fat-rich diet. It is suggested that it is possible to estimate vitamin E by its anti-exudative activity.

II. A severe generalized oedema causing death, developed in a large percentage of chicks fed a laboratory diet of dried skim milk, dextrinized corn starch, cod liver oil and mineral salts. Many developed a characteristic straddling stance due to the legs being forced apart by the accumulation of fluid under the skin of the ventral surface of the body: this subcutaneous oedema sometimes extended to the neck and back of the head. No recoveries were observed. The most consistent P.M. lesion was oedema of the heart and pericardium which occurred also in chicks which died without manifestation of any subcutaneous oedema. This disorder could be prevented by administration three times a week of approximately 7·5μg. of synthetic *d,l*-α-tocopherol in cod liver oil per gram live weight per day.

—R. Allcroft.

Evans, H. M., & Emerson, Gladys A. (1940). **Prevention of Nutritional Muscular Dystrophy in Suckling E-Low Rats with Alpha-Tocopherol and Related Substances.**—*Proc. Soc. exp. Biol., N.Y.* **44.** 636–639. 2 tables. [4 refs.]

The muscular dystrophy which usually occurs towards the end of the lactation period in the unweaned young of rats fed a vitamin E low diet, was prevented by the administration of 10 mg. of α-tocopherol to the mother on the day of littering. A supplement of 1 mg. daily to the young from the 10th day, or 3 mg. from the 15th day, also prevented the disorder, but administration of 3 mg. daily from the 18th

day was ineffective in preventing the dystrophy. Four compounds chemically related to α-tocopherol were tested for anti-dystrophic activity but were found to be inactive.—R. A.

KUHN, R., WALLENFELS, K., WEYGAND, F., MOLL, T., & HEPDING, L. (1939). Zur Spezifität des Vitamins K. **[Vitamin K]. [Correspondence].**—*Naturwissenschaften.* **27.** 518–519. [8 refs.]

Earlier American work had shown that the vitamin K obtained from alfalfa had a quinoid structure and that synthetic phthiocol (2-methyl-3 oxy-naphthoquinone-1-4) not only showed vitamin K activity but was probably the simplest member of a homologous series of similar properties. The present authors have shown that a variety of naphtho- and benzo-quinone derivatives are antihaemorrhagic and that the α-tocopherol-quinone derived by oxidation of vitamin E displays vitamin K activity, an interesting conversion of an anti-sterility factor into an antihaemorrhagic factor.—H. H. G.

I & II. GRIFFITH, W. H., & WADE, N. J. (1939–40). **Choline Metabolism. I. The Occurrence and Prevention of Hemorrhagic Degeneration in Young Rats on a low Choline Diet. II. The Interrelationship of Choline, Cystine, and Methionine in the Occurrence and Prevention of Hemorrhagic Degeneration in Young Rats.**—*J. biol. Chem.* **131.** 567–577, and **132.** 627–637. 1 fig., 13 tables. [Numerous refs.]

III. GRIFFITH, W. H. (1940). **Choline Metabolism. III. The Effect of Cystine, Fat, and Cholesterol on Hemorrhagic Degeneration in Young Rats.**—*Ibid.* **132.** 639–644. 3 tables. [9 refs.]

I. Young rats, 24–29 days old, readily developed fatty livers on high fat diets only moderately low in choline; older rats, 35–56 days, developed only slightly fatty livers on the same diets. Thirty-nine out of 40 young rats on a choline-deficient diet developed a haemorrhagic degeneration of the kidneys; histological examination showed massive tubular degeneration with haemorrhagic areas particularly in the cortex of the kidney. A decrease in the weight of the thymus and an increase in the weight of the spleen were associated with the renal degeneration. Haemorrhage into the eyeball occurred in the more severely affected animals. It was demonstrated that the addition of 0·25–0·50 mg. of choline chloride per g. of food was required to prevent this condition, and 1·0–2·0 mg. were necessary to prevent the occurrence of fatty livers.

It is suggested that choline is essential for the maintenance of the normal structure of tissues as well as for its lipotropic action.

II. The characteristic signs of haemorrhagic degeneration were intensified by the addition of cystine to a diet low in choline but high in fat; three times as much choline was required to protect rats fed the basal ration plus 0·5% of cystine. The autopsy of over 500 rats indicated that increase in the kidney weight is an accurate measure of choline deficiency. It was demonstrated that methionine had a choline-like action, as the addition of 10 mg. per g. of food to the basal diet prevented the occurrence of the renal lesions and fatty livers. From these results it appears that cystine and methionine in proteins are concerned with this disorder and that the amounts of these two amino-acids determine in part the requirement of the young rat for choline. That other factors also are concerned was indicated by the fact that diets containing 40% or more of casein and having a high fat content were completely protective, even if 2% of cystine was added. The maximum effects of choline deficiency occurred when the casein level was 15–25%, and then decreased as the casein values were further increased. It seems, therefore, that choline deficiency is also partly dependent on the composition and amount of the dietary protein.

III. It was shown that haemorrhagic degeneration could be produced in young rats on a basal, low fat, low choline diet, but the deficiency was more severe if the fat content of the diet was increased. The low fat ration was made very toxic by the addition of 0·5% of cystine. This demonstrated that the mechanism producing renal injury due to cystine was not dependent on the presence of dietary fat. In II it was observed that a high fat diet containing cystine and 40% or more of casein was protective, and this was found to be true also for a high casein and low fat diet. The addition of cystine and of cholesterol to the basal diet increased the severity of the haemorrhagic degeneration. If both cholesterol and lard were added to the diet, the renal injury was greater than that due to either supplement alone. All these toxic effects could be prevented by the addition of choline.

—R. ALLCROFT.

PUBLIC HEALTH

I. Newitt, A. W., Koppa, T. M., & Gudakunst, D. W. (1939). **Water-Borne Outbreak of Brucella Melitensis Infection.**—*Amer. J. publ. Hlth.* **29.** 739–743. 3 figs., 2 tables. [1 ref.] [Abst. from authors' summary].

II. Huddleson, I. F., & Munger, Myrtle. (1940). **A Study of an Epidemic of Brucellosis Due to Brucella Melitensis.** —*Ibid.* **30.** 944–954. 1 fig., 5 tables. [1 ref.] [Abst. from authors' summary].

I. An outbreak of 80 human cases of infection with *Br. melitensis*, with one death, occurred at Michigan State College, East Lansing, Mich. All cases occurred in students and others using a bacteriology building which contained a laboratory where large numbers of brucella cultures were handled. A faulty technique of sterilization of discarded cultures was demonstrated. Inadequate and faulty plumbing was found in which siphonage could be produced from the point where contaminated glassware was washed.

II. This refers to the brucellosis epidemic dealt with in I. Forty-five persons developed the clinical form, and possibly 49 the sub-clinical form of the disease.

It is suggested that infection occurred from the water supply of the building. If, however, the infecting organisms came through the water supply of the building due to back-siphonage, certain conditions affecting the water supply must have existed almost simultaneously. There was no proof obtained that any of the conditions necessary for back-siphonage had occurred in the building during the autumn and winter of 1938.

The hypotheses that have been offered to explain the source of infective material, when subjected to a critical analysis, lack sufficient proof to explain how the epidemic originated.

Duke, F. W. (1940). ***Brucella melitensis* in Cow's Milk.**—*Lancet.* **239.** 517.

D. (technician to the late Dr. Menton) reports that early in 1940 a strain of *Br. melitensis* was isolated in Staffordshire from a bulk milk sample from a herd of 76 cows. The strain was isolated in the course of the routine examination of brucella strains from milk samples suspected of tuberculosis. The strain had the typical cultural and serological characters of *Br. melitensis*.

This is the first occasion on which *Br. melitensis* has been isolated from cows' milk in Great Britain.—A. W. Stableforth.

Mattick, A. T. R., & Hiscox, E. R. (1939). **" High-Temperature-Short-Time " Pasteurization.**—*Med. Offr.* May 6th. 177–180. 3 tables. [17 refs.] [Authors' conclusions copied *verbatim*].

As much milk destined for human consumption is pasteurized by methods which do not conform to official requirements for " Pasteurized Milk ", it is desirable to know whether, when the apparatus is properly used and constructed, milk so treated is free from pathogenic organisms especially tubercle bacilli. It is also desirable to know whether the phosphatase test may properly be used for control purposes. The observations which we have recorded show that, in fact, tubercle bacilli are destroyed and phosphatase tests are negative in milk heated at temperatures and for times, other than those imposed by the present legal standards, which do not damage the cream line. It is suggested that the possibility of admitting " High-Temperature-Short-Time " pasteurization should now be seriously considered as an official method alternative to the holder process and that in the meantime the process may well be used for treating dairy by-products destined for animal consumption.

Houston, J., Kon, S. K., & Thompson, S. Y. (1940). **The Effect of Commercial Pasteurization and Sterilization on the Vitamin B_1 and Riboflavin Content of Milk as Measured by Chemical Methods.** —*J. Dairy Res.* **11.** 67–70. 4 tables. [8 refs.]

Using fluorimetric methods, the authors confirmed the results of earlier biological tests that up to 10% of the vitamin B_1 in milk is destroyed by commercial pasteurization and up to 50% by commercial heat sterilization. Riboflavin withstands both heat treatments without loss. —W. R. Muir.

I. Corwin, G. E. (1940). **State Wide Meat Inspection.**—*Proc. 43rd ann. Meet. U.S. Live Stk sanit. Ass., 1939.* pp. 70–82.

II. Ringer, I. W. (1940). **Meat Inspection in the Northwest.**—*Ibid.* pp. 84–97.

III. —. (1940). **Report of Committee on Meat and Milk Hygiene.**—*Ibid.* pp. 143–144.

IV. —. (1940). **Report of Special Committee on Poultry and Rabbit Meat Inspection.**—*Ibid.* pp. 285–296.

I. The paper is largely devoted to a consideration of the scheme of meat inspection existing in the state of Connecticut together with the terms of the Sanitary Code, the Meat Inspection Act and the rules and regulations governing the enforcement of the Act. Here every abattoir, which may be publicly or privately owned, is licensed and there are inspectors for each town, city, or borough in which an abattoir is located. Except for animals slaughtered for the owner's domestic use, and rabbits, hogs, sheep, and calves, not to exceed 15 in one year, slaughtered on the farm on which they were raised, all animals must be slaughtered for food in a licensed abattoir and in the presence of a meat inspector, who stamps all carcasses inspected and passed according to the established regulations. All poultry establishments where slaughter is carried out must be licensed, but poultry need not be killed in the presence of an inspector nor need the carcasses be stamped. The supervising State Inspector of Slaughterhouses and Meat Inspection must be a veterinarian. Inspectors must also be qualified veterinarians or have had five years' experience in abattoir hygiene.

A section of the Act lays down the conditions requiring the condemnation of the carcasses of young calves, kids, pigs, and lambs. The possession of any such flesh dressed in a manner suitable for sale or use is deemed *prima facie* evidence of an intent to sell and a violation of the provisions of that section of the Act.

II. In the state of Washington a system of voluntary meat inspection has been instituted and 50 out of 143 slaughterers in the state have accepted the service. There is one supervisor and ten full-time inspectors, together with a number of part-time veterinarians. The service costs about 60,000 dollars a year. The slaughterer pays for the service of the inspector, and the weakness of the scheme lies in the fact that the only penalty which can be imposed is the withdrawal of the inspection service for misconduct of the slaughterer.

R. considers that, except in the state of California, the consumer is not getting adequate protection. He believes state inspection to be better than city inspection, but adds that the real remedy is the provision of a national act to broaden inspection throughout the country and bring about a national system of meat inspection, financed by general appropriation, which would protect the health of the people, eliminate bitter barriers which have arisen between cities, prevent the sale of unwholesome meat, block the outlet for stolen cattle, and avoid the danger of corruption which is inherent in the present free system of inspection. In the U.S.A. at present, 65% of the meat is inspected under federal law. The percentage, he contends, should be much greater.

III. Supplementing the service of the United States Bureau of Animal Industry the states of Connecticut, Pennsylvania and Montana, and the city of San Antonio, Texas, have greatly improved their meat inspection services by the employment of competent state and municipal veterinary inspectors.

The Kellogg Foundation in Michigan has furthered meat inspection in small cities and towns and in rural communities by utilizing the services of practising veterinary surgeons for part-time inspection work.

IV. Depending upon the season, there are about 37 veterinarians and ten trained lay inspectors engaged in the administration and supervision of poultry inspection in the U.S.A. Opinion in the industry is generally greatly in favour of the extension of such inspection but varies in regard to the practicability of centralized slaughtering. The majority favour both *ante-* and *post-mortem* inspection and a large number regard a federal bureau as the proper authority to assume responsibility for the inspection.

A wide gap exists between the farm and market methods of dressing and preparing meats for sale, and the methods employed by the large poultry- and rabbit-packing companies. In the plants of such companies improved methods of preparation, including the complete drawing and quick freezing of poultry immediately after killing, enable a more attractive and wholesome product to be offered for sale to the public. Complete inspection is greatly facilitated in such plants.—H. V. Hughes.

Dixon, J. A. (1940). **Centralized Slaughtering.**—*J. R. sanit. Inst.* **61.** 58–68.

Although the Livestock (Restrictions on Slaughtering) Order of the Ministry of Food which came into force early in 1940 has controlled slaughtering and brought about the suspension of many private slaughter houses, centralized slaughtering is not universal in

Britain. Many private slaughter-houses still exist, the majority of which are described as situated in densely populated districts, the amenities of which they destroy through the noise made by animals awaiting slaughter, the creation of offensive odours, and the encouragement of flies and vermin.

The institution of a public abattoir always facilitates the provision of a wholesale meat market, a great advantage to the industry. It is important that a system of meat marking should be established. This could only be carried out at a public abattoir where an inspector can be present at the time of slaughter. Inspection of carcasses and organs of animals slaughtered should be undertaken by the Animal Health Division of the Ministry of Agriculture. Financial considerations should not prevent local authorities from establishing public abattoirs for they need not be expensive. They are an essential part of public health equipment.—H. V. HUGHES.

TWORT, C. G., & BAKER, A. H. (1940). **Effect of Smoke on Bacteria in the Air.**—*Lancet*. **239.** 587–589. 4 tables.

Examining the possibility of interference with the activity of germicidal aerosol mists by varieties of smoke, the authors found that under experimental conditions exhaled tobacco smoke interfered with the effect on a suspension of *Bacterium coli* of a 10% solution of hexylresorcinol in propylene-glycol in a concentration of 1 g. in 680 c.m. of air.

Incense had a lethal effect in a concentration of 1 g. in 3,000 c.m. of air after an hour's contact with atomised saliva. No account was taken of unburnt carbon, ash, or material passing into the air as vapour which was presumed to be inactive. Cardboard and incense smokes of concentration lower than 1 g. in 30 c.m. of air largely prevented the infection of the respiratory organs of mice by a suspension of *Salmonella enteritidis* ("Liverpool Virus" strain).—H. V. HUGHES.

MASTERMAN, A. T. (1940). **A System of Air Purification by Hypochlorous Acid Gas.** pp. 15. 6 tables. [2 refs.] London: Milton Proprietary Ltd. [8vo].

A report is given of a series of investigations on the use of hypochlorous acid gas as an agent in air purification. It is shown that it has a very high germicidal power on air-borne germs in concentrations (by volume) in the region of $\frac{1}{5 \times 10^6}$ to $\frac{1}{15 \times 10^6}$. These concentrations are far below the minimum irritant dose for the human subject to whom it is entirely innocuous at such dilutions. The application of hypochlorous acid gas by means of atomizers is simple and rapid and when accompanied by water, as in the recommended system of spraying, it cools and washes the air, removing solids in suspension; it reacts chemically with organic gaseous emanations and acts as a deodorizer, being itself devoid of smell in the concentrations used.—R. A.

THERAPEUTICS

MAYER, R. L. (1940). Note sur l'activité de deux nouveaux dérivés sulfamidés à noyau thiazolique dans les infections expérimentales de la souris. **[The Value of Two New Thiazole Sulphamide Derivatives in Experimental Infections of the Mouse].**—*Bull. Acad. Méd. Paris.* **123.** 348–357. 8 tables. [Num. refs.]

Tests have been made on the action of sulphathiazole and sulphamethylthiazole *in vitro* and *in vivo* in mice. These substances exert a marked bacteriostatic action *in vitro* against *Streptococcus haemolyticus* and *Str. viridans*, pneumococci, gonococci, staphylococci, and *Bacterium coli*. The actions *in vitro* compare favourably with those exerted by sulphapyridine. *In vivo* the activity of the thiazole compounds is of the same order as that of sulphapyridine. Further clinical tests are necessary.—J. M. ROBSON.

MARSHALL, E. K., Jr., BRATTON, A. C., WHITE, H. J., & LITCHFIELD, J. T., Jr. (1940). **Sulfanilylguanidine: A Chemotherapeutic Agent for Intestinal Infections.**—*Johns Hopk. Hosp. Bull.* **67.** 163–188. 10 tables, 5 graphs. [17 refs.]

The drug, given by mouth, is not more toxic than sulphapyridine and sulphathiazole in mice, rabbits, and dogs. It is fairly soluble in water (220 mg.%) but is poorly absorbed from the intestinal tract. It passes into the spinal fluid much more slowly than sulphanilamide and sulphapyridine, but rapidly penetrates into the tissues with the exception of the brain. The drug is somewhat less effective than sulphanilamide against β-haemolytic streptococcus infec-

tion in mice, but is as effective as sulphapyridine against a pneumococcus infection in mice. *In vitro* studies show that the drug is as effective as, or more effective than, sulphanilamide against various bacteria. The concentration of coliform bacteria in the faeces of mice can be reduced by its administration. It is suggested that the drug may prove effective in the treatment of bacterial infections which are localized in the intestine.—J. M. Robson.

Feldman, W. H., Hinshaw, H. C., & Moses, H. E. (1940). **The Effect of Promin (Sodium Salt of P,P′-Diamino-Diphenyl-Sulfone-N,N′-Dextrose Sulfonate) on Experimental Tuberculosis: A Preliminary Report.**—*Proc. Mayo Clin.* **15.** 695–699. 1 table. [5 refs.]

Thirty adult male g. pigs were treated with promin (added to the feed) and 20 animals were used as controls. The animals in the treated group lived longer than those not treated. The character and the degree of TB. in the treated animals showed that a definite inhibition was exerted by the drug on the disease. The drug did not produce any toxic effects in the g. pigs. A similar experiment made with sulphathiazole showed that the drug had little if any effect. —J. M. Robson.

Marshall, E. K., Jr., Litchfield, J. T., Jr., & White, H. J. (1940). **The Comparative Therapeutic Activity of Sulfanilamide, Sulfapyridine and Diaminosulfone in Streptococcus Infections in Mice.**—*J. Pharmacol.* **69.** 89–102. 1 fig., 5 tables. [20 refs.]

A comparison of the therapeutic activity of sulphanilamide, sulphapyridine and diaminosulphone in streptococcus infection in mice has been made by a method which eliminates to a large extent errors inherent in the methods in common usage. The drugs are given in the food to the animals kept in separate cages, and from the food intake the amount of drug taken in is calculated and the concentration of the drug in the blood determined. On the basis of the Median Survival Blood Concentrations, the activity ratios are 1·00, 1·09, and 2·92 respectively for the three drugs. The activity of the drugs *in vitro* has been compared on the basis of the minimal concentration of each drug required to sterilize an initial concentration of 5,000 units of a standard strain in peptone-dextrose broth during 48-hr. incubation. The *in vitro* activity of the three drugs may be expressed as 1·0, 2·9, and 9·3 respectively. —J. M. Robson.

Dawson, M. H., & Hobby, Gladys L. (1940). **The Chemotherapy of Experimental Streptococcal Infections with Gold Salts.** —*J. Pharmacol.* **69.** 359–364. 4 tables. [9 refs.]

Auro sodium thiomalate, administered subcutaneously in a single dose of 2 mg., protects the majority of mice infected with 1,000 lethal doses of haemolytic streptococci. Some chemotherapeutic effect is demonstrable with 0·5 mg. The acute toxic dose for white mice is at least ten times the effective therapeutic dose. The compound has a marked bacteriostatic effect against haemolytic streptococci *in vitro*. —J. M. Robson.

Russel, Dorothy S., & Falconer, M. A. (1940). **Local Effects of Sulphonamides on the Rabbit's Brain.**—*Lancet.* **239.** 100–101. 2 figs. [3 refs.]

The local application of soluseptasine (3·3 %), solid sulphanilamide, and solid sulphapyridine to the rabbit's brain does not cause any appreciable damage to the tissues. Sulphanilamide is preferable to sulphapyridine as it is more soluble. Excess of either substance will excite a foreign body reaction. Hence it is preferable to use these substances in solution on the brain, but if a powder is used the smallest effective quantity should be applied.—J. M. Robson.

Muñoz, M. (1938). **Sodium Iodide and Mercuric Iodide Treatment of Epizootic Lymphangitis of Horses.**—*Philipp. J. anim. Indust.* **5.** 489–492. 1 table. [4 refs.]

In the Philippines epizootic lymphangitis has been the scourge of horses in Manila and also of racehorses. Recently sodium iodide has been used in combination with mercury biniodide for treatment instead of potassium iodide, as it is less depressant to the heart. 2 g. sodium iodide and 0·2 g. mercury biniodide are dissolved in 20 c.c. of distilled water and given intravenously, treatment being repeated for six consecutive days. After 4–5 days' rest a second course can be given if it is considered advisable.

There is usually a marked decrease in the size of hard nodules after the fourth injection. The large nodules progress to the point of fluctuation, and when opened contain serous fluid and very little pus. Ulcers begin to dry up after the third injection.

The treatment of 97 cases is recorded, and it is stated that very few relapses have been observed.—U. F. RICHARDSON.

HEYMAN, Bernice, & GRUBB, T. C. (1940). **Further Studies of the Antibacterial Activity of some Fluorinated Aromatic Mercurials.**—*J. Bact.* **40.** 363–371. 4 tables. [8 refs.] [Authors' summary copied *verbatim*].

1. A comparative study of the antibacterial activity of 4-fluorophenyl-mercuric chloride, 4,4′-difluoro-2-chloromercuri-diphenyl and 4,4′-difluoro-3-chloromercuri-diphenyl indicated that the monophenyl compound was considerably more active than either of the diphenyl compounds against *Staphylococcus aureus* and *Eberthella typhosa* in water and serum dilutions of the compounds.

2. The 4,4′-difluoro-3-chloromercuri-diphenyl compound was more active in water dilutions against *E. typhosa* and *S. aureus*; and serum dilutions against *S. aureus* than the 4,4′-difluoro-2-chloromercuri-diphenyl. The results obtained with serum dilutions of the compounds against *E. typhosa* did not permit any conclusions to be drawn regarding the relative activity of the compounds.

3. An analysis of the relation between antibacterial activity and the relative positions of the mercuri chloride and fluorine groups on the monophenyl and diphenyl compounds indicated that while no general conclusion could be drawn concerning the monophenyl compounds, the two diphenyl compounds consistently displayed greater activity when the substituent groups were in the ortho rather than the meta position to each other.

COGGESHALL, L. T. (1940). **The Selective Action of Sulfanilamide on the Parasites of Experimental Malaria in Monkeys in vivo and in vitro.**—*J. exp. Med.* **71.** 13–20. 1 text-fig., 1 fig. on 1 plate, 1 table. [9 refs.]

With mixed malaria infections in the same experimental animal, sulphanilamide eradicated a virulent *Plasmodium knowlesi* infection, leaving the animal with a milder chronic *P. inui* infection. Determinations of the metabolic activity of the two parasites *in vitro* showed that *P. knowlesi* consumed about six times more oxygen than *P. inui*. The addition of sulphanilamide in concentrations less than that necessary to effect a cure almost completely inhibited the respiration of *P. knowlesi in vitro* and had no apparent effect in *P. inui*.—J. M. R.

VAN GOIDSENHOVEN, C., & SCHOENAERS, F. (1939). Essai de chimiothérapie de la dourine expérimentale par l'arsébényl. **[Treatment of Dourine with "Arsebenyl"].**—*Ann. Méd. vét.* **84.** 241–244. 1 fig., 1 table. [2 refs.]

A horse weighing 195 kg. which had been experimentally infected with *Trypanosoma equiperdum* was treated one month later with "arsebenyl", a Belgian equivalent of neosalvarsan; 7·5 g. of "arsebenyl" dissolved in 85 c.c. distilled water were inoculated intravenously and 24 hours later an inoculation of 8 g. was given. The temperature fell to normal and trypanosomes disappeared from the peripheral blood. Four days later fever recommenced and although the appetite remained good the animal progressively lost condition and nervous symptoms increased to a state of paralysis. Some 15 days later the presence of trypanosomes in the blood in increasing numbers was shown by g. pig inoculations, but not by microscopical examination. The treatment did not affect the complement-fixation reaction.—S. J. GILBERT.

VAN SACEGHEM, R. (1938). Traitement de la theileriose due à Th. parva par l'Acaprine. **[Treatment of *Theileria parva* infection with Acaprin].**—*Bull. agric. Congo belge.* **29.** 143–144. 1 table. [Also appeared in *Ann. Soc. belge Méd. trop.* **18.** 343–345. (1938)].

Four susceptible cattle, placed on infected pasture, showed febrile reactions in 13–18 days. Two were treated with subcutaneous injections of 6 c.c. of 5% solution of acaprin, and two with 3 c.c., repeated in each case 24 hours later. All the animals succumbed to *T. parva* infection. Calves which had passed through an attack of theileriasis in one district, and showed secondary attacks on removal to the laboratory, improved rapidly after treatment with acaprin. —S. J. GILBERT.

HOLMAN, H. J. [Edited by]. (1940). **A Survey of Insecticide Materials of Vegetable Origin.** pp. viii+155. [Numerous refs.] London: The Imperial Institute. [8vo] [3s. 6d.]

This survey is an excellent summary of present knowledge of insecticides of vegetable origin and contains a great deal of information not otherwise readily available on the sources, production, preparation, and trade in them. The book is divided into five parts, the first dealing with the alkaloid-containing substances

namely nicotine, anabasine, hellebore, and some of the lesser known ones. The second part deals with the plants containing rotenone and allied compounds, including derris and species of *Lonchocarpus* known as cubé, timbo, and barbasco. The third part deals with pyrethrum, the fourth with quassia, and the fifth with various plant oils. The subjects reviewed in each part cover the recent work on the chemical and insecticidal properties of each product, its physiological action, the insects against which it has been used and the forms in which it is applied. References to the more important literature dealing with the subject are also given.

The value of the book would have been greatly enhanced if an index had been added. —W. MOORE.

KING, R. E. (1940). **The Benzyl Benzoate Treatment of Scabies.**—*Brit. med. J.* Nov. 9th. 626–627. [4 refs.]

Benzyl benzoate is stated to be superior to all sarcopticides in that it is immediate and reliable in its action and leaves no post-therapeutic irritation of the skin. The treatment consists of first washing the affected area with soap and water and then rubbing into the part a lotion consisting of equal parts of benzyl benzoate, industrial spirit and soft soap (B.P., 1932).—W. MOORE.

SALISBURY, G. W., BAKER, D. W., & BRITTON, J. W. (1940). **Control of Equine Strongylosis. Part II. The Effect of Anthelmintic Treatment of Mares on the Development of Strongylosis in Foals.** —*Cornell Vet.* **30.** 367–375. 2 tables. [11 refs.] [For part I see *V. B.* **11.** 170].

This paper gives the result of an experiment to observe the effect of treating mares for strongyle infestation during the winter before the birth of their foals. The group used were six Percheron and five Belgian mares and their foals; seven foaled in May, two in April and one each in January and February; the last two were not given anthelminthic treatment, but the others each received 50 c.c. of carbon tetrachloride in the previous November, and 7 of them a second dose of 25 c.c. of this drug in February. All the treated mares were negative on examination for helminth ova two weeks after treatment. They were kept in individual box stalls, but fed on the floor, which was kept reasonably clean and dry, manure being removed daily. The first mares and foals were turned out to grass in May. All the foals were weaned at about five months of age and removed from the experimental pastures. The average pick-up rate of strongyle infection of the foals, with excessively dry pasture conditions and 89% reduction of exposure through treatment of the mares, was 39% less than in 1938 when the mares were not treated. The strongyle count at weaning was so low that treatment then appeared valueless. Comparison of results in the two years shows improved general condition in the 1939 foals, less diarrhoea, almost no cachexia, and all foals making satisfactory growth throughout the year, as compared with the poor condition, dullness, and unthriftiness of the 1938 foals. Ova of *Strongyloides westeri* were found in the foals' faeces 22 days, those of *Trichostrongylus axei* 33 days, those of *Ascaris equorum* 94 days, and those of the strongyles 95–120 days after birth. In one case there was evidence of prenatal infection by *Ascaris*, ova appearing on the 22nd day after birth—J. A. G.

ERHARDT, A. (1938). Testierungsmethode Ancylostoma-wirksamer Präparate und Chemotherapeutische Untersuchungen an der Ancylostomiasis der Katze. [**Method of Testing** *Ancylostoma*-**Active Preparations, and Chemotherapy of Ancylostomiasis in Cats**]. — *Arch. Schiffs- u. Tropenhyg.* **42.** 108–117. 2 figs., 5 tables. [Numerous refs.]

E. describes his method of infecting cats with ancylostomes. Infective larvae were obtained by a modified Fülleborn's funnel culture apparatus, in which the eggs are incubated on the surface of sand in a funnel, and the hatched larvae penetrate the sand and are collected in a water bath below.

Cats were successfully infected *per os* or percutaneously, 6·4–33% of the larvae being recovered as adults in the intestine after peroral infection [no comparable figure for percutaneous infection]. It was found that the worms matured quickly, and their eggs were recovered from the faeces about three weeks after infection.

For quantitative egg-count diagnosis, the tragacanth method of Szidat, modified by E., is preferred. The average daily output of eggs by a female *A. caninum* in the intestine of cats was 7,300, reckoned over a 54-day period, but there was an extreme daily variation.

For curative purposes " Filimaronöl " and

" Ascaridol " were about 100% effective, whilst carbon tetrachloride varied widely in effect in different cases.—J. E.

BROWN, H. P., & AUSTIN, J. A. (1939). **Treatment of Heartworms in Dogs with Stibsol—a New Drug.**—*J. Amer. vet. med. Ass.* **95.** 566–569. [Authors' summary copied *verbatim*].

A new organic antimonial, Stibsol (antimonial-3-catechol-thiosalicylic-acid-sodium), has been developed for the treatment of heartworm infestation (*Dirofilaria immitis*) in dogs. A concentration of this organic antimony compound in the blood stream is necessary before a noticeable destruction of microfilariae is observed.

A characteristic peak in the destruction of the microfilariae was observed after the second or third injection and again just previous to the disappearance of the microfilariae from the peripheral circulation. Heavy as well as light infestations respond to the treatment.

GRAY, E. (1940). **Some Experiments upon the Therapeutic Treatment of Fowl Paralysis (Lymphomatosis) of Poultry, and the Value of Iodine in Relieving the Symptoms of such Cases.**—*Vet. J.* **96.** 28–34. 7 figs. on 4 plates.

As a result of intraperitoneal injections into four paralyzed birds of " antibacsyn " (a proprietary preparation of euglobulin), " P.A.B.S." (*p*-amino-benzene-sulphonamide), and a 10% solution of potassium iodide in distilled water, G. claims that the paralysis was cured by the KI injections—antibacsyn and P.A.B.S. having no therapeutic action at all. Each bird received injections of the three drugs with a minimum period of one day between the injections. Another four paralyzed birds received KI alone; one recovered, two made partial recoveries and the fourth died from an incurable disease. [It may be pointed out that no evidence is produced that the birds really were affected with fowl paralysis and recovery might equally well have been due to proper feeding and removal from infected grounds.]

Blood counts were taken both before and after inoculation and the results tabulated.—G. C. B.

PIERRE-BOURGEOIS, BOQUET-JESENSKY, M., & PIERRE-BOURGEOIS, Denise. (1939). Étude expérimentale et therapeutique de l'action des hormones génitales sur les accidents menstruels des tuberculeuses. (Troisième mémoire. Sur la poussée menstruelle des tuberculeuses). [**Action of Sex Hormones on Menstrual Disorders of Tuberculous Women. Part III. On the Menstrual Flow**].—*Rev. Tuberc., Paris.* **5.** 754–774. 9 figs. [14 refs.] [Abst. from abst. in *Amer. Rev. Tuberc.* **42.** p. 9 of absts. Signed: H. L. I.].

Castration increased slightly the duration of life of g. pigs inoculated with tubercle bacilli. This effect was more marked in males. Injection of male and gonadotrophic hormones prolonged the life of males, while injection of folliculin and gonadotrophic hormone accelerated experimental TB. in females.

ANON. (1940). **Hormone Treatment of Undescended Testis.**—*Lancet.* **239.** 333.

Experimental observations on animals have shown that gonadotrophin plays a leading part in the natural descent of the testis. There appears to be no doubt that gonadotrophin is valuable in the treatment of undescended testis in cases of hypogonadism, whether accompanied by major and more general signs or merely by slight indications such as underdevelopment of the penis and scrotum. There is no good evidence for believing that continued therapeutic administration of gonadotrophin from a human source produces degenerative changes in the human testis. There is, however, a spontaneous recovery rate of some 60% in cases of undescended testis, and further experience is needed to determine the value of the treatment in cases where signs of hypogonadism are less obvious or are absent.

—J. M. ROBSON.

POISONS AND POISONING

LARSON, C. P., KELLER, W. N., & MANGES, J. D. (1939). **Accidental Canine Thallotoxicosis and Dangers of Thallium Used as a Rodenticidal Agent.**—*J. Amer. vet. med. Ass.* **95.** 486–489. 2 figs. [9 refs.] [Authors' summary copied *verbatim*].

The symptomatology and pathological lesions produced by thallotoxicosis are discussed.

Two cases of canine thallotoxicosis, with both

clinical and pathological observations, are reported. There were several noteworthy pathological alterations in these cases which the writers have not found on reviewing the literature on thallium poisoning. These were severe degeneration with necrosis of the hepatic parenchyma and myocardium, and foci of recent softening, petechial hemorrhages, with perivascular cuffs of exudate in the brain. This latter condition might well be termed a " chemical encephalitis " due to thallium.

The use of thallium as a rodenticidal agent, even in the hands of an expert, is an extremely dangerous procedure, as it endangers both pets and children.

BRADLEY, W. B., EPPSON, H. F., & BEATH, O. A. (1940). **Livestock Poisoning by Oat Hay and Other Plants Containing Nitrate.**—*Bull. Wyo. agric. Exp. Sta.* No. 241. pp. 20. 2 figs., 6 tables. [10 refs.] [See also *V. B.* **7.** 138 and 641 ; **8.** 606 ; **10.** 131, and **11.** 262.]

This bulletin covers work already reported in previous publications. Further details are given of the experimental feeding to calves and sheep of oat hay incriminated in natural cases of poisoning. It was also found that water extracts of such hays produced poisoning and death. As stated in earlier reports, the outstanding P.M. finding in poisoned animals was the dark chocolate-brown colour of the blood. Spectroscopic examination of the blood has now shown that this effect was produced by conversion of most of the haemoglobin into methaemoglobin, thereby causing death from asphyxia. Experimental results showed that a minimal dose of 25 g. KNO_3 per cwt. body weight caused death in calves, and indicated that ingestion of only 5½ lb. of hay containing 5% nitrate would produce fatal effects in a 500 lb. animal. The safe content of hay is arbitrarily placed at 1·5% KNO_3. Daily sub-lethal doses of KNO_3 given to cattle for one week to two months showed that no chronic type of poisoning could be produced. Experimental feeding of nitrate to two horses at the rate of 50 g. per cwt. body weight produced symptoms of poisoning.

The conversion of haemoglobin into methaemoglobin is effected by the presence of nitrite in the blood stream, and as analyses of the oat hays revealed only traces of nitrite but large quantities of nitrate (2·2–7·3%), the authors suggest that the reduction of the nitrate must take place in the digestive tract by the organisms normally present. Methylene blue has been shown to prevent the conversion of haemoglobin to methaemoglobin, and injection of a solution of this dye prevented death in experimentally poisoned animals [see also *V. B.* **11.** 262].

A list is given of weeds and cultivated crops, presumably grown on soils which had produced toxic oat hay, which contain high percentages of nitrate. Studies are now being made to determine what conditions of the soil are responsible for the concentration of nitrate in toxic forages.—N. J. SCORGIE.

DEEM, A. W., & THORP, F., Jr. (1939). **Toxic Algae in Colorado.**—*J. Amer. vet. med. Ass.* **95.** 542–544. 1 fig., 1 table. [2 refs.] [Authors' summary copied *verbatim*]. [See also *V. B.* **10.** 465].

While it is believed that the death of the ducks and the wild birds found around the lake [in Colorado] were due to the effect of the toxic algae, the cause of the deaths of the fish and reptiles is only speculative. It was first believed that they might have died of suffocation, due to the fact that the water was stagnant. Carp, however, are probably, rather resistant to suffocation, and the lake was no more stagnant than before the fish began to die.

The experimental work has shown that the algae were toxic to rabbits, guinea pigs and chickens. The poison was not neutralized by botulinus antitoxin A, B, or C. The water filtered from the algae was toxic to guinea pigs. The symptoms and rapid death of the experimental animals following the administration of the algae corresponded to the description given by Fitch *et al.* [*V. B.* **5.** 662.] and was not characteristic of botulinus poisoning.

The ground-up emulsion of dead fish, either filtered or unfiltered, was not toxic to guinea pigs. *Clostridium botulinum* was not isolated from the fish or one of the dead birds by suitable anaerobic methods.

PHYSIOLOGY

NEUMANN-KLEINPAUL, K., & BEHRENS, D. (1940). Ueber Trachealgeräusche beim Pferde. **[Tracheal Sounds in the Horse].** —*Arch. wiss. prakt. Tierheilk.* **76.** 1–23.

A description of research on refinements in the technique of auscultation of respiratory

sounds in the trachea of horses. Using apparatus consisting essentially of a phonendoscopic telephone receiver coupled to an electrocardiograph, tracheal sounds were registered on strip film. The results of experiments on ten horses, some with respiratory disease, are described and illustrated.

At the present stage the value of the method does not mark a definite advance in the diagnosis of respiratory disease, but research is to be continued.—J. E.

RANKIN, A. D. (1940). **A Study of Absorption from the Rumen of the Sheep.**—*Thesis, Cornell.* pp. 27. [15 refs.]

A series of experiments on four sheep, to determine whether certain materials are absorbed through the rumen mucosa. The substances used were dextrose, potassium iodide, pilocarpine, strychnine, and sodium cyanide. The test materials were placed in the rumen through a permanent fistula. During the experiments, the reticulo-omasal orifice was closed by a stomach clamp to prevent the spread of the material into the omasum.

The use of dextrose caused a distinct rise in the blood sugar level. Pilocarpine caused distinct salivation in 5–10 min. Potassium iodide was demonstrated in the saliva at the end of 5 min. Fluid extract of nux vomica killed two sheep in less than one hour. Sodium cyanide killed one sheep in 43 min. R. concludes that these experiments lend strong support to the growing belief that the rumen is an organ of absorption.—H. L. GILMAN.

RALSTON, N. P., COWSERT, W. C., RAGSDALE, A. C., HERMAN, H. A., & TURNER, C. W. (1940). **The Yield and Composition of the Milk of Dairy Cows and Goats as Influenced by Thyroxine.**—*Res. Bull. Mo. agric. Exp. Sta.* No. 317. pp. 75. 33 figs., 27 tables. [Numerous refs.]

After a review of the literature on the thyroid, its anatomy, secretion, relation to metabolic rate, heart rate, blood pressure, lactation, and the pituitary, the results are given of the effect of subcutaneous injections of thyroxine in alkaline solution (15 mg. per day on three successive days every month at Missouri, and 9·1 mg. per day for six days every 28 days at Mississippi Agricultural Experiment Station), to cows throughout the lactation period. There was an average increase in milk yield of 18·6%, total fat 22·5%, and percentage fat 4·75% at the Missouri and 18·54%, 24·26%, and 4·3% respectively at the Mississippi Station, over the preinjection levels. The increase was at a maximum 6–8 days after the injection and fell to normal values in 12–14 days. The heart rate increased 7·64 beats per min. and the temperature remained normal. The increase was relatively greater in the declining phase of lactation than at the peak. In the Missouri experiments there was least response in April and October, while the Mississippi data showed no seasonal variation.

Similar findings were obtained in experiments on goats. In the declining period of lactation there was an increased daily milk yield of 69·6%, and fat 62·3%. Serum and milk analyses in the goat experiment showed no change in their osmotic pressure; the blood sugar first rose and then fell, the blood fat changing reciprocally. The percentage lactose increased and the percentage fat in the milk decreased throughout the experiment. The daily thyroxine injection required to maintain normal heart rate and milk production in thyroidectomized goats was found to be approximately 1 mg. per day.

A preliminary electrocardiographic study of the effects of thyroxine injections on the heart for short periods showed no damage in the case of the cow but definite damage in the goat.

Whether it is practical to increase milk production in this way is discussed, and it is left an open question until more work has been done.—E. I. MCDOUGALL.

DAY, F. T., & MILLER, W. C. (1940). **A Comparison of the Efficiency of Methods of Diagnosing Equine Pregnancy, with Special Reference to the Mucin Test.**—*Vet. Rec.* **52.** 711–716. 7 tables, 1 graph. [1 ref.]

[For a description of the techniques employed for the biological diagnosis of equine pregnancy, see *V. B.* **10.** 470.] In this article the authors give further details of pregnancy diagnosis by the mucin test and by rectal palpation.

The comparative results of clinical and biological methods of pregnancy diagnosis in a number of selected mares over a two-year period are given in tabular form. The examinations were carried out at various stages throughout the gestation period.

The results were as follows, only those which were incorrect for the period of pregnancy when each test is normally applicable being included :– The mucin test was carried out 765 times on 545 mares and there were 59 false

positive and 20 false negative results. Corresponding figures with blood serum tests were 381, 180, 8, and 26; and with urine 207, 101, 0, and 43.

When the mucin test was used, false positive results were yielded three times as often as false negative results; with the blood test false negative results were given about three times as often as false positive results; with the urine test all the errors were false negative reactions.

With the urine test the wrong results were partly due to the necessity of keeping samples for an unduly long time before the test could be carried out. A more accurate estimation of this test is furnished by the following figures obtained from the records of testing samples for the years 1935–39 :– number of tests carried out, 514; number of incorrect results, 44; percentage of error, 9·3.

The authors conclude that while no one test is infallible, each has its particular uses, and that the mucin test has the widest range of application.—N. J. Scorgie.

Parker, G. H. (1940). **A Modern Conception of the Action of the Nervous System.**—*Science*. **92.** 319–323.

Synaptic transmission can occur in one way only, unlike transmission along a nerve fibre; it also is a much slower process. It used to be interpreted as a purely electrical phenomenon but recently the theory that it is accomplished by means of "neurohormones" has been rapidly gaining ground. The evidence for the existence of such substances is discussed in relation to knowledge regarding the chromatic nerve fibres and the chromatophores found in the skin of certain animals. It was found that the eyes were necessary for the chromatic activity of the skin in the frog and the mechanism was considered to be reflex. Later it was shown to be due to a hormone "intermedin", secreted by the intermediary part of the pituitary, not only in frogs but also in other amphibians, and in lamprey eels, most sharks and rays, the caroline lizard, shrimps, prawns, and crabs. A second type of chromatic activation is found in the smooth dogfish in which both "intermedin" and nervous control are concerned. Darkening of the skin is produced by intermedin while blanching is due to nervous mechanism. A third type is seen in the catfish in which the melanophores have a double innervation, one producing darkening and the other blanching. Darkening is also due to intermedin which has a pronounced effect. This complex system is found in many teleosts and also probably in the African chameleon. There is much evidence to support the theory that the opposing sets of fibres are cholinergic and adrenergic as in other parts of the autonomic nervous system. The action of acetylcholine and adrenalin in producing colour changes when in aqueous solution is very transient but in oily solutions it is prolonged; this suggests that lipoids and similar substances may act in the body as protective reservoirs. It is still impossible to exclude entirely the possibility of electrical synaptic transmission at certain places, yet the humoral theory offers a natural explanation for synaptic polarization as transmission can only occur in one way if one side is secretory and the other receptive. It also offers an explanation for synaptic delay which does not appear to be a likely occurrence with electrical transmission.—A. T. Phillipson.

Clarke, Eleanor L., & Boyd, E. M. (1940). **A Seasonal Study of the Iodine Content of the Blood of Birds.**—*J. biol. Chem.* **135.** 691–695. 1 table. [9 refs.]

The blood iodine was determined in ten pigeons and chickens bought monthly from dealers throughout the year. While there was some individual variation, no gross seasonal variation was evident. The means of 110 pigeons were 4·2 μg per 100 ml., standard deviation 1·7, and for 80 chickens 4·1 μg per 100 ml., standard deviation 1·6.—E. I. McD.

Sutra, C. J., & Pomerantz, L. (1939). **Effects of Estrogen on Bones, Joints and Ligaments of Castrated Guinea Pigs.**—*Arch. Surg., Chicago.* **39.** 992–1000. 7 figs. [13 refs.]

The effects were investigated of subcutaneous injections of 12,000–60,000 rat units of oestrogen on (1) the tissues of the pubic symphysis and the sacro-iliac joints, (2) autogenous transplanted segments of the pubic symphysis with attached ligaments, and (3) the capsular tissues of the major joints of 12 castrated mature g. pigs. The results showed that castrated male g. pigs could be successfully feminized by injections of oestrogen; enlargement of the nipples and the formation of areolas occurred. As regards the effect on the skeleton, the most striking effect was produced in the region of the symphysis pubis. The ligaments, especially the posterior one, became hypercellular, increased in thickness and invaded the interpubic cartilages and the posterior cortices of the

pubic bones. Even in transplanted segments of the pubic arch the posterior ligaments became hypercellular when the animals received sufficient quantities of oestrogen. It appears that the pubic ligaments, especially the posterior one, are affected in a specific way by oestrogen. The lack of reaction in the ligaments of the sacro-iliac joint is noticeable.

—R. ALLCROFT.

NEWTON, W. H., & BECK, Naomi. (1939). **Placental Activity in the Mouse in the Absence of the Pituitary Gland.**—*J. Endocrinol.* **1.** 65–75. 2 text-figs., 3 figs. on 1 plate, 1 table. [Num. refs.]

Destruction of the foetus of pregnant mice about the 12th day of gestation through bursting the amniotic sac by digital pressure through the abdominal wall results in retained placenta and the remaining weeks of pregnancy approximate closely to the normal; mammary development and ligamentous transformation of the symphysis pubis occurs in spite of the absence of the growing foetus. Removal of the ovaries shortly after foetal destruction does not cause involution of the mammary gland and in many cases it continues to develop normally provided the placenta is retained. If, however, the placenta is aborted, as it frequently is, the mammary gland rapidly undergoes involution.

In these experiments hypophysectomy was performed upon mice either carrying a placenta or in which both foetus and placenta had been removed. Mammary development, body weight, and symphysis pubis were observed. The results were similar to those previously observed when the ovaries were removed; if the placenta was present the mice developed normally, if the placenta was absent then rapid involution of the mammary gland occurred and the symphysis pubis failed to open.—**A. T. P.**

MILLER, M. E. (1940). **The Dissection and Study of the Trunk of the Dog.**—*Thesis, Cornell.* pp. 221. [Numerous refs.]

A very comprehensive guide for the dissection of the muscles, nerves, and blood vessels of the trunk of the dog. Not illustrated.—**H. L. G.**

TECHNIQUE AND APPARATUS

COOPER, M. L., & GRABILL, F. J. (1939). **A Simplified Apparatus for the Preservation of Bacterial Cultures in the Dried State.**—*J. Lab. clin. Med.* **25.** 184–188. 1 fig. [6 refs.] [Authors' summary copied *verbatim*].

A simple, inexpensive, low vacuum apparatus is described which satisfactorily freezes and dries 32 bacterial cultures daily. The small amount of time required for operation is much in its favor. The simplicity of the apparatus and procedure makes low temperature desiccation of heat labile substances available to the average laboratory.

BRAGA, A. (1939). Notas cyto-biologicas. (Contribuição à technica de histocultura e virus-cultura). [**Notes on Tissue Culture and Virus Culture**].—*Bol. Inst. Vital Brazil.* No. 22. Reprint pp. 34. 16 figs. [French summary].

B. describes his technique for tissue and virus culture, referring, in detail, to the general conditions such as provision for cell respiration and the removal of waste products. In virus culture the use of plasma obtained from the species from which the virus was isolated was found to be most satisfactory.

Theoretically it is possible to cultivate any tissue but in practice some tissues are more easily cultivated than others. B. suggests that virus cultures should be made on tissues which they attack by preference, *e.g.* neurotropic viruses on nerve tissues.

B. also found that cultures were sometimes subject to fatty degeneration and to counteract this he advises the use of plasma from a starved subject in which there is little lipoid material.

Various methods of virus culture are discussed, instances being given of culture on growing tissues, surviving but non-proliferating tissues, and on chick chorio-allantoic membranes.

The reactions of tissue cultures to viruses and bacteria are described. Normal cells will not proliferate in the presence of cancer cells but they stimulate the growth of the latter. No difference could be found between animal and human cancer cells.—MILLER WATSON.

HORSFALL, F. L., Jr. (1940). **A Low Temperature Storage Cabinet for the Preservation of Viruses.**—*J. Bact.* **40.** 559–568. 5 figs. [8 refs.] [Author's discussion copied *verbatim*].

The low temperature storage cabinet described in this paper was designed to accommodate a large number of virus specimens in an easily

accessible manner and to maintain them in a state of unaltered infectiousness. The preservation of the activity of unstable viruses for periods of months makes possible intermittent or delayed study of a given specimen. The systematic storage of specimens in numbered racks permits the rapid location of any particular tube. The specimen tubes are surrounded simply by a cold gas mixture resulting from the evaporation of solid carbon dioxide, and there is, therefore, no possibility that a virus-inactivating agent, as for example alcohol, might enter the tubes. The use of celluloid instead of glass tubes eliminates the loss of specimens resulting from cracked, or broken tubes, and the substitution of metal screw caps for stoppers prevents the unstoppering of tubes due to gas expansion during thawings. The small-sized celluloid tubes afford an additional advantage since they are of dimensions and material suitable for use in the high speed vacuum centrifuge (Bauer and Pickels, 1936) and, therefore, permit the direct concentration of active material in the original storage container.

Bauer, J. H., & Pickels, E. G. (1940). **Apparatus for Freezing and Drying Virus in Large Quantities under Uniform Conditions.**—*J. exp. Med.* **71.** 83–88. 3 figs.

If a virus in a medium rich in protein is desiccated properly in the frozen state and then kept at ice-box temperature, it remains active for years. A practical way of enabling this to be accomplished has been designed by the authors who make use of a cold trap as a desiccating agent. This consists of a brass cylinder (closed at its lower end) which is immersed to almost half its depth in a mixture of alcohol and solid CO_2 within a 12 gal. thermos jar which in turn is enclosed in an insulated box. Attachments are made to the container to be desiccated, to the vacuum pump, and to the pressure gauge. The material to be dried is kept during the desiccating process in a frigidaire ice cream cabinet. The apparatus, which is described in detail and simply and clearly explained with the help of diagrams and photographs, maintains the virus material throughout the desiccating period at a temperature considerably below its original freezing point. By its use several hundred c.c. of virus material distributed in small containers can be desiccated simultaneously to almost complete dryness with no appreciable loss of infectivity. The good keeping qualities of the virus activity are assured by sealing the containers either when evacuated or after filling with dry nitrogen.—J. R. Lawson.

Chorine, V. (1940). Utilisation des anticoagulants salins tamponnés pour le maintien du volume globulaire réel et pour le dosage des protéides plasmatiques. [**Utilization of Buffered Saline Anticoagulants in Maintenance of the Correct Corpuscular Volume and in Estimation of the Plasma Proteins**].—*Rev. Immunol.* **6.** 193–208. 13 tables. [1 ref.]

A continuation of previous work [*V. B.* **10.** 885]. C. considers that the addition of citric or oxalic acid to blood results in a concentration of the plasma due to hydration of the red cells. This result is reversed when the neutral salts of these acids are used. Monosodium citrate at 0·5% caused a slight dehydration of the cells whilst disodium citrate caused a slight hydration. The distribution of water between the cells and the plasma *in vitro* depends upon the ratio of anions to cations in the substance added to the blood; hydration of the cells occurs when the anions are in excess, dehydration when the cations predominate.

Mixtures of citric acid and dry powdered citrates, or oxalic acid and oxalates, act in a variable way on the distribution of water between the different elements of blood. Their action depends particularly on the length of time elapsing after they are reduced to powder. By keeping these mixtures in a vacuum in the presence of phosphorus anhydride, the action of the citrate can be stabilized. In tests to find an anticoagulant which would not upset the composition of the plasma, *i.e.* one which would cause neither hydration nor dehydration of the blood cells, a mixture of citric acid and trisodium citrate was finally adopted—in a proportion of 3 : 7 for human or rabbit blood, and 1 : 2 for sheep or fowl blood, the mixture being added to blood in the amount of 0·5%.

The distribution of water amongst the various elements of the blood occurring after the addition of the above anticoagulant remains stable for at least 36 hours and the pH of tubes of blood so treated did not change appreciably within three hours.

C.'s method of anticoagulation by powder is suitable for analytical work on blood, but

unsuitable for blood transfusion work, as it causes a slight amount of haemolysis, which has an adverse effect on the recipient. On the other hand, the use of liquid anticoagulants, by adding to the volume of blood, hinders analytical work, and causes, when concentrated anticoagulant comes into contact with blood cells, dehydration of the latter, which is overcome by the use of C.'s acid-salt buffered mixture either in liquid or in powder form.

Finally, C. outlines his analytical technique for some of the blood proteins.—H. V. HUGHES.

MACGREGOR, R. G. S., RICHARDS, W., & LOH, G. L. (1940). **The Differential Leucocyte Count.**—*J. Path. Bact.* **51.** 337–368. 10 figs., 9 tables. [Numerous refs.]

Different methods of counting leucocytes may give rise to variations exceeding 20% on the same film. For this reason an exhaustive study of the distribution of the white cells and the methods of counting them was undertaken. The most accurate method, *i.e.* that giving the closest value to the number found by a count of the whole film, is the battlement edge count. Counts performed on cover-slips give a higher value for polymorphonuclears and a lower value for lymphocytes than the battlement edge count.—J. A. NICHOLSON.

DUFFIELD, J. W. (1940). **Time Savers for Fixing and Dehydration.**—*Stain Tech.* **15.** 57–59. 2 figs.

A time-saving device which is described and illustrated is a double wash-bottle which delivers equal volumes of two solutions and which may be of use for fixatives which have to be prepared by mixing two liquids just before use.

Dehydration of the blocks of tissue (very small portions of plant tissue are particularly mentioned) might with advantage be carried out by placing them in small perforated wire baskets which are immersed in a Buchner funnel, the stem of which is closed by rubber tubing and a clip and the top covered with a Petri dish. At suitable intervals the fluid in the funnel can be run off into bottles and replaced by the next reagent.

This method appears to be suitable for very small portions of tissue, *e.g.* biopsy material, which may be difficult to deal with in the usual way. Embedding in paraffin can also be carried out within the wire baskets.—E. G. W.

MANER, R. (1939). Ueber die Färbung der Spirochaeta icterohaemorrhagiae und anderer Leptospiren. **[Staining of *Leptospira icterohaemorrhagiae* and other Leptospira].**—*Zbl. Bakt. I.* (*Orig.*). **143.** 462–464. [Numerous refs.]

Various methods recommended for staining the spirochaete of syphilis were tested for their value for leptospira, but none proved satisfactory. Giemsa stain was the only one giving good results, and this only if the preparations had been fixed in alcohol or in osmic acid vapour. It is confirmed that the demonstration of living leptospira can be carried out by the addition of methyl violet solution (1 : 1,000) to fresh material, but it is considered that this method of examination is not as reliable as the use of dark ground illumination.—U. F. R.

MICHELSON, L., & WILCOX, Aimee. (1940). **A Rapid Thick Film Blood Stain.**—*Publ. Hlth Rep., Wash.* **55.** 1221–1222.

A method of staining thick blood films with a Giemsa-Wright mixture is described, the time required being reduced to 11 min. 1·515 g. of Giemsa powder is suspended in 100 c.c. anhydrous glycerin and, with great precautions to exclude moisture, is heated in a waterbath at 55°–60°C. for two hours. 100 c.c. Wright's stain solution B. is added and the mixture allowed to stand over night. Next morning another 800 c.c. Wright's stain solution B. is added, the mixture shaken and the amount required for a few days' work filtered into a small bottle. For use the stock solution is diluted 1 : 10 with water, the slide being immersed in the stain for 10 minutes, and then the serum flushed off with distilled water. The slide is finally immersed in neutral distilled water for 1 min.—U. F. RICHARDSON.

BENEDEK, T. (1939). **The Cantharides Blister and Its Application in Microbiological Research: A Review of the Literature and Some Suggestions.**—*J. trop. Med. Hyg.* **42.** 81–86. 1 fig. [Num. refs.]

B. suggests the use of the cantharides blister for the diagnosis of bacteraemia and of any disease in which micro-organisms are present in the blood. Many kinds of bacteria, protozoa, and viruses of human disease have been found present in the fluid of such blisters and microscopic or cultural diagnosis can be easily carried out with the fluid from unopened blisters.—J. E.

MOHR, A. (1940). Das Gipsmodell bei den Zahnleiden des Pferdes. **[Plaster Cast Models of Tooth Abnormalities and**

Disease of the Horse].—*Arch. wiss. prakt. Tierheilk.* **76.** 51–74. 15 figs. [16 refs.]

This is a general article on modern methods of equine dentistry according to the researches of Becker [*V. B.* **8.** 831.], with special reference to the preparation of plastic impressions and plaster casts of teeth. The method is of great use in diagnosis and valuable for teaching purposes, whilst it is indispensable for the making of "stoppings" for plugging of cavities and of false teeth.—J. E.

MISCELLANEOUS

—. (1940). **Imperial Veterinary Research Institute, 1890-1940. Golden Jubilee.** —*Indian Fmg.* **1.** No. 11. Suppl. pp. 52. 13 plates, 1 table.

To celebrate the golden jubilee of the institute a supplement giving an account of its foundation, growth and achievements has been published.

The growth of the institute from the time when it was started by Lingard as a small laboratory at Poona in 1890 is traced, with the move to Mukteswar in 1893, the tremendous development at Mukteswar and, finally, the opening of the Izatnagar sub-station, with its sections of biological products manufacture, animal research and poultry research.

Special chapters are devoted to:– Fifty Years of Veterinary Research in India; The Imperial Veterinary Research Institute: 1890–1940; Early Days of the Institute; The Section of Pathology and Bacteriology; The General Disease Investigation Section; The Section of Veterinary Zoology; Estate, Veterinary, Medical and Engineering Sections; General Administration and Finance.

Watts, P. S. (1940). **Biennial Reviews of the Progress of Dairy Science. Section E. The Diseases of Dairy Cattle.**—*J. Dairy Res.* **11.** 316–350. [Numerous refs.]

This is an extensive review of the literature from 1936–1939 on mastitis, contagious abortion and bovine tuberculosis.—J. E.

Herman, H. A., & Ragsdale, A. C. (1939). **Artificial Insemination of Dairy Cows.** —*Bull. Mo. agric. exp. Sta.* No. 407. pp. 31. Numerous figs., 2 tables.

An account is given of the method of artificial insemination employed in the dairy herd of the University of Missouri and by about 100 dairy farms in the district. In general the Russian procedure is followed. Semen is collected in an artificial vagina consisting of a heavy rubber cylinder 16½ in. long and 2¾ in. in diameter, fitted with a thin rubber lining and maintained at an inside temperature of 105°–110°F. by a water jacket. The cows are inseminated by pipetting about 1 c.c. of semen 1 in. into the cervix. Where only 3–6 cows are to be inseminated from one ejaculate undiluted semen is used. In larger herds, however, the semen can be diluted according to the Milovanow Formula SGC–2. Such diluted semen is sufficient for 8–20 cows. Usually one insemination per cow about 10–15 hours after commencement of oestrus is sufficient. In difficult cases two injections, one shortly after oestrus begins and another 12–20 hours later, are advocated. With this method 503 of 517 cows inseminated became pregnant. The average service rate has been 1·8 per conception.—D. D. Ogilvie.

Bonnier, G., & Trulsson, Sally. (1939). **Artificial Insemination of Chickens with Semen Diluted in Ringer Solution.**—*Proc. 7th World's Poult. Congr., 1939.* pp. 76–79. 6 tables. [6 refs.] Washington, D.C.: U.S. Dep. Agric. [In English].

This investigation reports the results obtained from artificial insemination of 257 hens with mixed semen from 30 cocks. The semen was either given undiluted or diluted with Ringer solution; 30% semen gave better results than undiluted semen, and 10% semen gave as good results as undiluted semen. The percentage of fertilization was decidedly lower with 2% semen. In the experiments there was great variation among individual hens in the ability to become fertile. It was also found that there is variation in the reaction of individual hens to different sperm concentrations.—N. J. S.

Bonadonna, T. (1939). **Artificial Insemination of Birds.**—*Proc. 7th World's Poult. Congr., 1939.* pp. 79–82. 1 table. Washington, D.C.: U.S. Dep. Agric. [In English].

A general article pointing out the advantages of artificial insemination of birds.—N. J. S.

Burrows, W. H., & Quinn, J. P. (1939). **Artificial Insemination of Chickens and**

Turkeys.—*Proc. 7th World's Poult. Congr., 1939.* pp. 82–85. 1 table. [Numerous refs.] Washington, D.C.: U.S. Dep. Agric. [In English].

This article reviews three aspects of artificial insemination of chickens and turkeys, *viz*, (1) collection of semen, (2) insemination of females, and (3) storage of semen. The most satisfactory method of obtaining semen was found to be the direct milking of the semen from the bulbous ducts of the copulatory organ, thereby making the process independent of the ejaculatory response [see BURROWS & QUINN. (1935 and 1937). *Poult. Sci.* **14.** 251, and **16.** 19]. The amount of semen obtained at a single collection varies with different breeds, averaging about 0·5–1 c.c. per daily collection for cocks and 0·3–0·4 c.c. for turkey toms. It has been shown that semen production is closely correlated with testis size. The technique for insemination of hens consists in exposing the orifice of the oviduct and injecting the semen directly into it [see QUINN & BURROWS. (1936). *J. Hered.* **28.** 31]. The fertility obtained varies from mating to mating and with the individual hen, as it also does in natural matings. An attempt at a turkey-chicken cross yielded fertile eggs and embryos were obtained, but no living hybrids hatched [see QUINN, BURROWS & BYERLEY. (1937). *J. Hered.* **28.** 169].

The authors state that up to the present it has not been found possible to develop a satisfactory method of semen storage. When stored at 4·4°C. spermatozoa were found to have lost their ability to fertilize eggs after two hours. At body temperature the semen rapidly became putrid, whilst storage at 20°C. resulted in spermatozoa retaining some fertilizing power, but the number of fertile eggs obtained decreased as the storage time increased.

—N. J. SCORGIE.

SAUNDERS, A. R. (1939). **Statistical Methods with Special Reference to Field Experiments.**—*Dep. Agric. S. Afr. Sci. Bull.* No. 200. pp. 112. 3 figs., 72 tables, 1 appendix. [Numerous refs.] [2nd Edit.] [8vo] [1s.]

This bulletin was originally intended as a report of results obtained at Potchefstroom in the application of modern experimental methods in agriculture, but has been widened to include a discussion of statistical technique itself. It is written from the point of view of an experimenter actively engaged in research, and although not of direct veterinary interest it should prove valuable to all concerned with statistical principles in relation to the design of experiments. As YATES expresses it in his foreword, the paper provides "an illustration of the fact that it is not the possession of elaborate statistical training that is required for the understanding of new methods but rather the practical experience of handling results obtained by them".—H. H. GREEN.

SWAINE, J. M. (1939). **Scientific Research, the Key to Progress in Agriculture.**—*Trans. roy. Soc. Can.* **33.** Reprint pp. 18.

This address deals with recent advances in science as applied to agriculture and animal husbandry and disease, with special reference to North America. The organization of agricultural research in Canada is also described and the various foundations and institutes are named.—J. E.

OFFICIAL AND OTHER REPORTS

—. (1938). **Proceedings of the Second Meeting of the Animal Husbandry Wing of the Board of Agriculture and Animal Husbandry. Held at Madras from the 14th to the 16th December 1936.** pp. 284. Numerous tables, appendixes. New Delhi: Manager of Publications. [8vo] [Rs. 3-10 or 6s. 3d.]

There were 38 subjects for report and discussion, grouped under the following headings:—Veterinary Education, Animal Health, Livestock Improvement, Animal Industry, Animal Nutrition and Dairying. Papers were read by individuals and discussed by the conference. The following are of veterinary interest.

VETERINARY EDUCATION

1. OLVER and AGGARWALA presented a detailed report on the present status of veterinary education in India, in which it was stated that the provincial veterinary colleges could not turn out graduates above the grade of veterinary assistant surgeon. They put the case for a central veterinary college which could give higher education, so that graduates might be produced with knowledge equal to that demanded by the M.R.C.V.S. diploma. Plans for such a college at Izatnagar together with a

suitable curriculum are also given. The Sub-Committee on Veterinary Education approved these plans.

2. TAYLOR contributed a paper in which he pointed out the need for elementarily-trained stockmen to assist in technical animal health and disease work (castrating, branding and inoculating animals, dispensing simple medicines, etc.). He recommended a course of three months' instruction at a veterinary college. The Conference approved the scheme, but recommended six months' instruction at a veterinary college or large district hospital.

3. KARTHA reported on the existing methods of giving tabular information in the reports of the civil veterinary departments and made several suggestions by which the tables might be improved and made more uniform. He gave eight model forms for the tabulation of records. The Conference approved the latter with a few amendments.

ANIMAL HEALTH

1. The Sub-Committee on Animal Health considered the subject of RINDERPEST control, but refrained from advising the use of goat virus in any particular condition.

2. HURLEY gave a report on HAEMORRHAGIC SEPTICAEMIA in the Madras Presidency from 1898 onwards, giving tables showing losses and immunizations from 1926–1936. He stated his belief that outbreaks could be controlled by antiserum and that vaccination was unnecessary. In the discussion various opinions were expressed and it was agreed that antiserum and vaccine each has its use in different conditions.

3. DATTA gave a brief review of the various types of MASTITIS and described observations on mastitis in cows and buffalo cows in India. Most cases were caused by staphylococcal infection. After discussion the Conference stated the need for continued investigations.

4. SHIRLAW gave a review on BLACKLEG and its control by immunization: he concluded that the best immunizing agent is a formalinized whole culture. In the discussion the need for a special investigation on the localization of blackleg in India, its diagnosis and control, was expressed. The Conference recommended the appointment of a special worker at Mukteswar for anaerobic research.

5. SHIRLAW, in a short report, drew attention to the similarity between KUMRI and EQUINE ENCEPHALOMYELITIS and suggested that they have a common cause. In the discussion the need for intensive research was emphasized.

6. FARBROTHER named ANTHRAX, PASTEURELLOSIS, FOOT AND MOUTH DISEASE, POX, PLEURO-PNEUMONIA and SCAB as the most important diseases of sheep and goats in India. As a first step in control, educational work among sheep owners was necessary. BALWANT SINGH gave notes on ANTHRAX, BLACKLEG, RINDERPEST, FOOT AND MOUTH DISEASE, POX and SCAB in sheep and goats and on *Brucella melitensis* INFECTION, PLEURO-PNEUMONIA and CONTAGIOUS ECTHYMA in goats in India. He advocated control by quarantine. The Conference recommended that sheep and goat diseases should be given more attention by Investigation Officers and that the possibilities of control by quarantine methods should be examined.

7. AGGARWALA stated the need for the creation of quarantine stations at export ports of India, so that animal breeders could develop the export trade, which remained small whilst there could be no guarantee that animals were free from contagious disease. He also drew up quarantine rules and a schedule of diseases, which the Conference approved as a basis for further consideration.

8. MALIK described various types of ANTHRAX vaccine and suggested that they should be more widely used in India. In the discussion MITCHELL described his anthrax vaccine in use in Burma, and SHIRLAW the Mukteswar vaccine. The Conference expressed the need for more attention to anthrax, its localization and diagnosis in the provinces, and recommended the use of spore vaccines.

LIVESTOCK IMPROVEMENT

1. NAIK gave a paper on the economic losses to animal husbandry caused by ticks, described some dipping tanks and recommended the wide-scale adoption of the South African type for India. He also provided a list of ticks known to occur in India, Burma, Ceylon and on the Andaman and Nicobar Islands, and estimates and specifications for a dipping tank. The Sub-Committee on Livestock Improvement called for more information on various points and recommended that a start be made to provide tanks.

2. NANDA described methods of branding and tattooing animals and gave a draft standard code for the description of cattle. The Conference suggested that tattooing was the best method of marking for general purposes and that breeding stock be branded on the cheek.

ANIMAL NUTRITION

1. SEN reviewed the literature on nutrition and its connexion with reproduction, suggesting that abortions in stud mares in India have a nutritional origin, which should be investigated. The Conference recommended more research on this problem.

2. RAMIAH in a short report referred to the paucity of information as to whether mineral deficiency plays a large part in malnutrition and diseases of cattle in India. Work in Madras showed that grasses were deficient in Ca and P. The Conference endorsed the need for research, which would be done at the New Central Institute of Animal Nutrition.—J. E.

INDIA. (1939). **Administration Report of the Mysore Serum Institute for the Year 1937-38 with the Government Review Thereon.** pp. 38. 9 tables, 16 appendixes. [fcp].

STAFF.—The veterinary staff consisted of the director and six veterinary inspectors.

GENERAL.—The demand for the products of the Institute increased and their sale effected a net profit of Rs. 70,000. Work to improve the quality and variety of production is described, and investigation as to the extended use of the products in the field is discussed. It was shown that the simultaneous inoculation of anti-rinderpest, anti-haemorrhagic septicaemia and anti-blackleg sera did not affect the potency of the first named: goat rinderpest virus injected with haemorrhagic septicaemia vaccine and blackleg bacterin remained effective.

Research was carried out on RINDERPEST, HAEMORRHAGIC SEPTICAEMIA, BLACKLEG, SHEEP POX and FOWL CHOLERA. The bovine strain of rinderpest virus was passaged through 41 buffalo bull calves during the year without alteration in virulence, and a goat-adapted rinderpest virus was passaged through 101 goats without change. Goat virus was found to cause rather severe reactions in sheep. An attempt to test the potency of sheep-pox vaccine on rabbits and g. pigs gave unsatisfactory results. It was found that lambs born of ewes immune to sheep pox possessed a passive immunity which waned after 6–7 months. A formolized vaccine against fowl cholera was found to be superior to carbolized or heat-killed vaccine.

SCIENTIFIC SECTION [RAO, K. R.]—Samples of johnin and avian tuberculin were prepared and tested on 20 animals artificially infected with JOHNE'S DISEASE. The johnin proved much more reliable than the avian tuberculin for diagnosis as checked by P.M. examination. Attempts made to transmit the disease to rabbits, g. pigs, rats, and poultry were unsuccessful. It was set up only in sheep and goats after a period of 4–6 months. It is claimed that chaulmoogra oil gave good results in the treatment of Johne's disease. Notes are also given on other diagnostic and therapeutic work.

RESEARCH SECTION [NAIDU, P. M. N.]—A list is given of 12 disease conditions investigated, of which the following are noteworthy. An acute outbreak of COCCIDIOSIS in cattle caused the loss of 40% of adults and 100% of calves. An apparent failure of goat virus immunization against RINDERPEST is being investigated. Research on the aetiology of CONTAGIOUS PLEURO-PNEUMONIA of goats was undertaken but not completed. Some South African merino sheep imported for breeding contracted HEARTWATER soon after arriving and 6 out of 12 died. The type of RABIES in dogs in Mysore is described. It is practically always of the "dumb" type. Twenty-eight out of 39 dogs' brains examined were positive for rabies. Notes are given on POULTRY DISEASES in Mysore.

NAIDU also reports his work on anthrax (saponin) vaccine, strangles vaccine, spleen tissue rinderpest vaccine and anti-rabic vaccines. A preventive rabic vaccine for dogs was made according to Finzi's method and was used on 45 dogs by single dose inoculation after being tested on rabbits. A modified vaccine of the above type was also prepared and tested for use as a curative vaccine for animals. A course of six doses is used for large animals and three doses for dogs. Thirty-four dogs, 1 sheep and 15 cattle were so treated and none contracted rabies.—G. WILLIAMSON.

AUSTRALIA. (1938). **Report on Animal Health and Nutrition Investigations, Council for Scientific and Industrial Research 1937–38.**—*Rep. Coun. sci. industr. Res. Aust., 1937–38.* pp. 27–40.

Studies on HAEMONCHOSIS, TRICHOSTRONGYLOSIS and OESOPHAGOSTOMIASIS have been continued. Carefully planned trials have shown that the results obtained by the Baermann technique, for the isolation of parasitic larvae from soil and pasture, are highly inconsistent.

An organism, which has been designated "K", has been isolated from FOOT-ROT lesions and lesions typical of foot rot have been

set up with pure cultures of this organism.

Experiments on MYXOMATOSIS of rabbits have been continued. In one experiment 863 rabbits were added to a colony during the period 6th February, 1937 to 30th June, 1938. Of these 583 have been picked up dead of myxomatosis and 75 have died from other causes. Approximately 20% died underground in the warrens and have not been recovered. About 90% of the animals added to the colony died of the disease within 30 days of being introduced.

Further observations have been made on the use of finely atomized cultures to reproduce BOVINE CONTAGIOUS PLEURO-PNEUMONIA experimentally. The value of this technique has been confirmed. In the diagnosis of infection the complement-fixation test proved much superior to the agglutination test which often becomes negative before clinical signs subside, even sometimes before they appear, and is always negative after the clinical phase passes.

Experiments which are still in progress at the McMaster field station embrace studies on FERTILITY in sheep including factors governing the occurrence of oestrus, the inheritance of colour in sheep, the inheritance of wrinkling, and cattle/zebu hybridization. Rugging trials were carried out on sheep and under the conditions of the experiment, namely, freedom from dust and burrs together with a low rainfall and moderate temperature, rugging proved to be uneconomical.

GINGIN DISEASE (ATAXIA in lambs) has been shown to be associated with a copper deficiency in ewes. The disease can be cured by making small quantities of copper available to the ewes.

In studies on PHOSPHORUS METABOLISM of sheep, animals grazed on pastures produced on country considered to be markedly phosphorus deficient have received a phosphate supplement providing an extra gramme of P per sheep per day. Over a period of 18 months treated sheep, compared with controls, have not benefited in growth rate or in quantity and quality of wool growth, in spite of the fact that the treatment brought about an almost continual increase in the concentration of blood phosphate in the dosed animals.

A comparison of mono-, di-, and tri-calcium phosphates as sources of P for sheep has shown no different effects on general health, increase in weight, wool production, or inorganic blood phosphate level during three years of the experiment.

A comprehensive monograph [see *V. B.* **10.** 115.] dealing with work on COAST DISEASE has been published. Soluble cobalt and copper salts diluted with common salt have proved effective in preventing the appearance of untoward symptoms in areas where the flocks are given salt licks.

Energy balance methods have been utilized to study problems associated with the digestion of roughage, and an investigation is being made of the factors influencing the activity of the symbiotic rumen flora with a view to supplying the materials which limit digestion of the cellulose in the dry rough rations available during drought periods. The possibility is being investigated of utilizing yeast as a supplement to provide factors necessary for the activity of cellulose-splitting organisms of the rumen where sheep are on diets consisting largely of wheat straw, and a study is being made of the comparative quality of protein concentrates for supplementary and drought feeding.—M. C. FRANKLIN.

AUSTRALIA. (1938). **Report on Entomological Problems, Council for Scientific and Industrial Research, 1937–38.**—*Rep. Coun. sci. industr. Res. Aust., 1937–38.* pp. 14–22.

SHEEP BLOWFLY PEST.—It is estimated that losses due to fly strike in sheep probably amount to about £4,000,000 per annum. Studies on the stimuli which affect blowflies have been carried out, using special traps, a tropometer [*V. B.* **9.** 394.] and an insectary. Indole was less attractive than liver-sulphide [? liver of sulphur], but more attractive than indole + ammonium carbonate. Tests of colour responses showed yellow to be the most attractive, followed by blue and pink, with green last. A considerable amount of time has been devoted to a study of the putrefactive ("P") factor and specific sheep ("S") factor postulated by HOBSON in England [*V. B.* **6.** 140, and **7.** 280]. It was found that any degree of artificial attractiveness, from the equivalent of a struck sheep downwards, may be produced at will by treating sheep with appropriately selected "P" substances.

A standard medium for studies on the growth and nutrition of maggots has been developed consisting of yeast and sodium chloride in an agar basis. Blowfly maggots have been reared in the absence of animal protein. Of 49 substances tested for stomach toxicity to newly hatched maggots, only eight

proved poisonous at a concentration of 0·01% or less, namely, salts of cadmium, arsenic and selenium, potassium cyanide, naphthalene, nicotine, chloracetamide, and phenothiazine. Others, including boric acid, were toxic at somewhat higher concentrations. Well-known poisons such as zinc sulphate, formalin, anabasine, and pyrethrum showed surprisingly low toxicity for maggots. Various derivatives of phenothiazine were tested, but were inferior to the parent compound. Tests for contact toxicity of 159 organic compounds showed the following to give a reasonably quick kill :– hydrocarbons with six or more carbon atoms, halogenated compounds, certain aldehydes and sulphur compounds, and essential oils containing benzaldehydes, alkyl disulphides, carvone, or carvacrol.

Borax in baits in traps has been found useful in preventing the development of maggots, but its usefulness is destroyed if the bait becomes flooded by rain.

It has been found that when lambs are marked (*i.e.* docked, castrated, and ear-marked) when three weeks old the incidence of fly strikes is only 6·7% of that in lambs marked when eight weeks old. In the younger group healing was more rapid.

Parasites of Cattle Ticks.—A survey of cattle ticks (*Boophilus*) in Australia has not revealed the presence of indigenous parasites.

Ephemeral Fever of Cattle.—The virus has been maintained artificially for 16 months by serial inoculation of cattle, and has reached its 61st passage. The filtrability of the virus and its localization in the white-cell fraction of the blood have been confirmed. It is not, however, present in high concentration in either splenic or lymphoid cells, so it seems that it is not a parasite of the reticulo-endothelial system. The virus persists in infected cattle for only five days after the onset of symptoms, but blood taken at the height of the fever will remain infective up to 22 days if kept at 2°C. It has been demonstrated that the blood-borne organism is not usually transmissible by either subcutaneous or intradermal inoculation, but only by direct intravenous inoculation. This suggests the intervention of a blood-sucking vector in which some cyclical development may be necessary. It has been found that immunity following an experimental attack of the disease persists for at least seven months and probably for more than 12 months. As the experimental disease is mild, this fact may have a practical utility, should another epidemic occur.

—H. McL. Gordon.

Australia. (1938). **Annual Report of the Veterinary Research Officer, 1/10/37 to 30/9/38, of the Western District Research Association.** [Fraser, W. A. Carr]. pp. 9. Camperdown, Victoria : Western District Research Association. [4to].

This report to farmers and other members of the association takes the form of a review of recent advances in the knowledge of sheep diseases, made by research workers in Australia, in so far as they apply to local conditions in Victoria. Diseases discussed include " unthriftiness ", balanitis, foot rot, enterotoxaemia, and internal parasitism. The conditions under which tuberculin testing of milch cows is carried out are also described.—J. E.

Southern Rhodesia. (1940). **Report of the Director of Veterinary Research For the Year 1939.** [Lawrence, D. A.] pp. 7. Salisbury : Rhodesian Printing & Publishing Co. [fcp].

The authorized staff consisted of the Director, 1 veterinary research officer and 4 European technical assistants. The routine services, diagnostic investigations, and the production of vaccines and stock remedies, occupied the greater part of the time of the staff. Research work included experiments on methods of serological diagnosis and means to improve and stabilize combined Redwater and Gallsickness vaccine [no details given]. An improved technique for the diagnosis of *Fasciola hepatica* infestation was evolved. The samples of faeces were prepared as for the ordinary worm egg detection by the sugar flotation method, washed twice at slow centrifuge speed, and finally the eggs floated up with undiluted glycerin. Routine diagnoses included examination of 3,637 smears and 2,861 samples of sera.

Vaccines and remedies prepared and sold included Blackleg vaccine 90,884 doses, Horse Sickness vaccine 1,888 doses, Bluetongue vaccine 3,180 doses, Nodular Worm remedy and " Tetram " worm remedy, as well as 656 doses of Redwater and Gallsickness vaccine for the premunization of cattle, mainly imported animals and calves.

The commonest conditions encountered P.M. in poultry were Fowl Typhoid, Bacillary White Diarrhoea, Fowl Pox, and Roup ; suspected Psittacosis in the five survivors of

25 Indian partridges imported from India was also investigated.

Two bulls imported from Great Britain reacted to the double intradermal tuberculin test applied after arrival in Rhodesia; in only one of these was a TUBERCULOSIS lesion found, in a small abdominal lymph node. The majority of the horses in Southern Rhodesia have been inoculated one or more times with the neurotropic vaccine for protection against HORSE SICKNESS. Figures supplied by the police indicate that of a total of 2,848 horses in Southern Rhodesia only 148 deaths were attributed to horse sickness, even by the owners, and of these 64 had been inoculated and 84 were uninoculated animals. Although it may be possible to improve the present vaccine by the incorporation of more aberrant strains of the virus, some losses would still be possible, as there is evidence to show that certain individuals are incapable of acquiring and maintaining an immunity.

CONTAGIOUS ECTHYMA was again encountered in sheep and also in calves and in an eland calf. The infectious nature of the disease was demonstrated by the transmission of the infection artificially. All the cases recovered spontaneously. THEILERIASES in which Koch's bodies appear but in which the P.M. and clinical findings differ from EAST COAST FEVER (*T. parva* infestation) are still under investigation.—J. A. GRIFFITHS.

BASUTOLAND. (1939). **Report of Veterinary and Livestock Division, 1938-1939.** [HENDERSON, G. T.]—*Rep. Dep. Agric. Basutoland, 1938–39.* pp. 3–32. Numerous tables.

The European staff consisted of the principal veterinary officer, one veterinary officer and seven agricultural and livestock officers. A large part of the report deals with the animal husbandry side of the division's work, which includes schemes for the improvement of the livestock of Basutoland, wool sorting etc. The measures for the control of disease in livestock included the administration of 12,273,961 doses of vermifuge to sheep and goats for intestinal HELMINTH INFESTATION (sheep are dosed monthly, as far as weather conditions permit), and 20,227 doses of carbon tetrachloride for trematode infestation, provision of free dipping for sheep infested with "KED" (*Melophagus ovinus*), ANTHRAX vaccine inoculations twice a year in the areas in which infection exists, and the use of prophylactic vaccines in combating PARATYPHOID, STRANGLES, FOWL TYPHOID, "CATARRHAL FEVER" of sheep, and AFRICAN HORSE SICKNESS. Acaprin is said to be equally successful for the treatment of PIROPLASMOSES of both equines and dogs; piroblue was also used with success in equines. The infectious diseases reported during the year included FOWL TYPHOID, BLACKLEG (very prevalent), RINGWORM in cattle, ANAPLASMOSIS, "CATARRHAL FEVER of sheep," and AFRICAN HORSE SICKNESS. Other diseases mentioned are DIARRHOEA in calves, VAGINITIS in dairy cows, and EPHEMERAL FEVER of cattle. The territory has been free from SHEEP SCAB for seven years. The ectoparasites causing mortality among sheep in the lowlands are *Ixodes rubicundus* (the paralysis tick) during the autumn, *Oestrus ovis* (the nasal fly), and *Stomoxys calcitrans*, especially after shearing. In cattle, psoroptic MANGE and lice cause economic loss. Among equines ENDEMIC CIRRHOSIS due to senecio poisoning, and OSTEOPOROSIS, are encountered. —J. A. GRIFFITHS.

BRITISH SOMALILAND. (1940). **The Annual Report of the Somaliland Protectorate Veterinary and Agricultural Department for 1939.** [PECK, E. F.] pp. 12 + 2. [fcp] [Mimeographed].

Veterinary policy in British Somaliland is subservient to pastoral and arable agricultural policies. Drought, starvation, and erosion are limiting factors and veterinary policy must aim only at the preservation of useful life.

VETERINARY WORK IN THE SOMALILAND CAMEL CORPS.—General health was good. ANTHRAX was not diagnosed. TRYPANOSOMIASIS (*T. evansi*), formerly common, was dealt with by BENNETT'S test and by treatment and gave less trouble. CUTANEOUS NECROSIS OF CAMELS caused by salt deficiency was under control. ARTHRITIS OF CAMELS was also prevented by a liberal salt ration of 4–5 oz. daily. No case had been seen for the past two years. MANGE was rare and soon cured. Infestation with TRICHOSTRONGYLES caused poor condition in camels during a drought. A course of treatment with copper-nicotine-sulphate was not wholly successful. Ponies were treated bi-annually for HELMINTHIASIS and this policy has been justified by results. The Kenya vaccine proved valuable in the control of HORSE SICKNESS.

VETERINARY PROTECTORATE WORK.—No outbreak of ANTHRAX was reported, though cases probably occurred. RABIES was not reported. The incidence of CONTAGIOUS BOVINE PLEURO-

PNEUMONIA increased, there being 35 infected herds as against 12 in 1938; the disease was dealt with by quarantine. RINDERPEST was confined to the western half of the country; only ten herds were infected as against 51 in 1938, but mortality was high owing to drought. An experiment suggested possibilities of control by the use of Kenya goat-passaged virus, but it was doubtful whether this method could be considered economical in view of the poor grazing and periodical droughts. Outbreaks of HORSE SICKNESS caused mortality in horses and donkeys (all uninoculated). Private owners were supplied with vaccine on request. BRONCHO-PNEUMONIA and BRONCHITIS were common and frequently fatal in camels. Derris powder was tried for the control of ticks on goats and Black Faced Persian sheep, but proved ineffective as it would not adhere to the hair.—H. E. HARBOUR.

NORTHERN RHODESIA. (1940). **Annual Report of the Veterinary Department For the Year 1939.** [MORRIS, J. P. A.] pp. 21. 13 tables. Lusaka: Govt. Printer. [fcp] [2s. 6d.]

STAFF.—Two new appointments brought the total number of district veterinary officers to eight. A number of temporary stock inspectors were appointed and numerous staff transfers were made to meet the threat of introduction of RINDERPEST from Tanganyika Territory. Expenditure was £37,119.

LIVESTOCK INDUSTRY.—A scheme of payment of government grants towards purchase of breeding stock was much appreciated, and the number of breeding stock imported in 1939 rose to 213. Imports of slaughter stock totalled 4,357 and 161,380 lb. of frozen meat were also imported. A start was made with the creation of the Livestock Division described in last year's report [*V. B.* **10.** 642]. This part of the report also includes detailed notes on animal husbandry, the sheep and pig industries, dipping, etc. Health of livestock generally has been good.

ANIMAL DISEASES.—Apart from the threat of RINDERPEST the general disease position was quite good. The Territory remained free from JOHNE'S DISEASE, GLANDERS, EAST COAST FEVER, and FOOT AND MOUTH disease. Fourteen outbreaks of ANTHRAX and 38 of BLACKLEG were reported and controlled by vaccination and quarantine. Prophylactic vaccinations against anthrax were carried out. CONTAGIOUS ABORTION is enzootic. Two cases of bovine TUBERCULOSIS were reported in a grade herd. The general incidence of the disease was as described in last year's report. No reactors to the tuberculin test were detected in imported breeding stock in 1939.

BRONCHO-PNEUMONIA of sheep was fairly widespread. Initial lesions are usually in the right apical lobe of the lung and pleuro-pneumonia and pericarditis sometimes develop. Dipping aggravates the condition. BACILLARY WHITE DIARRHOEA is developing into a serious menace to the poultry industry; import regulations for poultry have been stiffened.

Twenty-six outbreaks of ANAPLASMOSIS and nine of bovine PIROPLASMOSIS were recorded, but these figures give no true indication of the prevalence of these diseases which are enzootic. Short interval dipping is practised. Acaprin or trypanblue are usually effective against piroplasmosis. No material change could be recorded in the position in relation to TRYPANOSOMIASIS which is enzootic in five-eights of the territory. The field campaign for control of CONTAGIOUS BOVINE PLEURO-PNEUMONIA in Barotse province was continued and a total of 77,104 head was inoculated. The results of the campaign so far have been very encouraging. The mortality rate in inoculated cattle was about 0·2% and the incidence of the disease has definitely decreased in the inoculation areas. The success of the vaccinations has resulted in the whole-hearted co-operation of the native cattle owners. Over 1,000 slaughter cattle were transported by rail from the quarantine in the infected Barotseland area to Livingstone. Among them 678 "lungers" were detected, while 36 active cases were seen.

RINDERPEST caused considerable anxiety during the year as the southward spread of the great epizootic in Tanganyika Territory reached a point only 40 miles from the border. Energetic measures had been taken to prevent the introduction of this devastating disease. These included the creation of a belt of triple vaccinated cattle along the northern border, extensive game surveys [movements of infected game through the fly-belt are of particular danger in this area] and co-operation with Tanganyika in a vaccination campaign starting at the southern border and working northwards. Rinderpest has not occurred in Northern Rhodesia since the end of last century. Sixty-eight outbreaks of HEARTWATER were notified. Short interval dipping during the months when the bont tick is present in large numbers has proved effective

in decreasing both the numbers of outbreaks and the mortality. Nine outbreaks of RABIES were reported. Two cases of HORSE SICKNESS, one fatal, occurred in horses previously vaccinated with the vaccine prepared in the Union of South Africa. Fifty-one outbreaks of STREPTOTHRICOSIS were encountered. The disease referred to in the 1938 report as " PSEUDOURTICARIA " was not seen in 1939.

—H. E. HARBOUR.

NYASALAND PROTECTORATE. (1940). **Report of the Veterinary Department for the Year ended 31st December, 1939.** [DE MEZA, J.] pp. 8. 2 appendixes. Zomba: Govt. Printer. [fcp] [1s.]

The position of livestock as a whole has changed little during the year. Animal health was not as satisfactory as in the previous year. TRYPANOSOMIASIS has been widespread, the position assuming serious proportions in the Lower Shire district. Exceptionally heavy rains early in the year caused flooding of the pastures which persisted far into the year and in some places it was impossible for cattle to obtain grazing. Whole herds became emaciated through starvation and this contributed to the large numbers of deaths. The losses were checked in several herds by the use of intravenous injections of tarter emetic, but deaths occurred until the end of the year. In the Zomba district one herd was treated with antimosan and tarter emetic but the disease still existed at the end of the year. In north Nyasa the disease responded quickly to treatment. There was no outbreak of EAST COAST FEVER in the Southern Province and as railway transport is available for slaughter animals it is hoped to prevent further extensions of the disease by the wanderings of cattle to that area. Small losses occurred in the enzootic areas from E.C.F. There were fewer cases of RABIES. The hope that the spread southward of RINDERPEST in Tanganyika Territory would be checked by the measures taken (the wholesale use of formalinized vaccine) in the Iringa area in 1938, proved vain. In August, alarming reports were received of outbreaks of the disease to the south-east and south-west of the area dealt with in 1938. Conferences were held at Mbeya, Mpwapwa, and Lusaka when plans were devised for the protection of territories south of Tanganyika. These included a large increase of the guards on the Nyasaland-N. Rhodesia-Tanganyika border and the triple vaccination of all (86,000) cattle in the area between the border and the Stevenson Road. This was commenced early in 1940.

In regard to animal husbandry some improvement has been recorded in the northern Nyasa, Mzimba, and Kasunga districts. Mzimba, with the benefit of a permanent veterinary officer, has made the most progress, more especially around the demonstration stock farms and in the ghee-producing areas. Improved housing and feeding has reduced calf mortality and increased milk production. The rinderpest campaign interfered with progress in northern Nyasa. Improvement has been effected in the welfare of the herds in the Kasunga district, where losses from TRYPANOSOMIASIS have been annually recurrent for a great number of years, by the introduction of better cattle pens and calf houses, and also by provision for the treatment of all cattle infected with trypanosomiasis. A definite advance is recorded in all branches of the livestock industry, *i.e.* dairy products, slaughter cattle, hides and skins, and ghee manufacture, which are all being fostered by the department. There were 62 cattle-dipping tanks under the supervision of the department and compulsory seven-day dipping was enforced throughout the year. The number of specimens examined for diagnosis was 1,190. No research work was carried out. Expenditure amounted to £9,149 and revenue was £858.—J. A. GRIFFITHS.

SIERRA LEONE. (1939). **Report on Livestock, 1938.** [ROACH, S. A.]—*Rep. Dep. Agric. Sierra Leone, 1938.* pp. 81–89.

With the exception of attacks by *Stomoxys nigra* the condition of cattle has been good. A few flies appear first in June or July and their numbers quickly increase until the climax is reached in August or September. Towards the end of September they commence to decrease and by mid-October there are none to be seen. This pest is a serious menace to cattle husbandry. Herds are stampeded and animals thus lost, while the weaker older animals and the calves suffer a more concentrated attack. Hunger, thirst, and lack of rest, as much as loss of blood, may cause collapse, in which case the animal is slaughtered by the owner. Other difficulties to the cattle industry are cattle thefts and poor breeding stock.

Most of the sheep are from French Guinea. The majority of the ewes give birth to twins or triplets and there is much loss of lambs from malnutrition. HELMINTHS also cause losses.

Very few good specimens of pigs are seen.

The boars particularly are stunted but some of the sows are fair specimens.

Abattoir observations of 654 cattle slaughtered show that 8·7% had LIVER FLUKE infestation, 6·1% ANGIOMA of the liver, and 3·4% CYSTICERCOSIS. There was no TUBERCULOSIS. Sheep, goats, and pigs were apparently free from the above conditions. In poultry hatched from imported eggs, round, tape and gizzard worms have been troublesome, particularly in the wet season. In addition to the losses from deaths much debility is caused in those that survive. ROUP, FOWL POX and GAPEWORMS, particularly the latter, occur in chicks.

—J. A. GRIFFITHS.

COLONY OF MAURITIUS. (1939). **Report of Veterinary Division, 1938.** [LIONNET, F. E.]—*Rep. Dep. Agric. Mauritius, 1938.* pp. 61–65.

Diseases dealt with by the veterinary staff were TUBERCULOSIS, TRYPANOSOMIASIS, and PIROPLASMOSIS. 1,774 centres were inspected. Tuberculin tests of 181 bovines showed 19 positive. BCG vaccine is being used by some breeders to immunize calves.

The number of blood smears examined for trypanosomes totalled 19,048, but of these only 38 were positive, 13 equine and 16 bovine being positive for *T. evansi* and 1 equine and 8 bovine for *T. vivax*. All these cases recovered except 3 equines and 1 bovine, all except the 1 bovine having been treated [no details of treatment]. In two bullocks REDWATER is said to have been successfully treated with trypanblue. No research on animal diseases is recorded. Bulls and heifers of the Afrikander and Charolais breeds were imported during the year. Altogether 3,608 bovines were imported from foreign countries, a reduction from the total of 5,967 in 1937.—J. A. GRIFFITHS.

ZANZIBAR PROTECTORATE. (1940). **Report of Veterinary Work, 1939.** [AHMEDI, F. D.]—*Rep. Dep. Agric. Zanzibar, 1939.* p. 14. 1 table.

An outbreak of RINDERPEST occurred amongst slaughter stock imported from Kenya, but the disease was confined to the quarantine area. CONTAGIOUS PNEUMONIA OF GOATS was also introduced and a small local outbreak occurred. FOWL TYPHOID was seen and dealt with by means of vaccine from Kenya.

Sanitary Inspectors were trained in meat inspection. Two assistants were stationed in Pemba. Progress was made with the castration of undesirable male stock both in Pemba and in Zanzibar. Abattoir statistics are given.

—H. E. HARBOUR.

BURMA. (1939). **Report on the Civil Veterinary Department, Burma, for the Year ending the 31st March, 1939.** [MITCHELL, D. T.] pp. 29. 8 tables, 1 map. Rangoon: Supt. Govt. Printing & Stat. [8vo] [Rs. 1.8 = 2s. 3d.]

The staff consisted of six posts in the Burma Veterinary Service (class I), nine posts in the B.V.S. (class II), 55 posts for veterinary inspectors and 194 posts for veterinary assistants. There were 54 vacancies in the subordinate posts and one in the B.V.S. (class II). Over 32,000 cases were treated by officers while on tour and at the veterinary hospital, Insein and the dispensary, Tatkôn. The work of the veterinary college for the training of veterinary assistants was continued; 13 students completed the 12-month course. The Burma students training abroad were 15 in India and two in the British Isles.

HAEMORRHAGIC SEPTICAEMIA was as usual most prevalent in the delta and maritime districts, 3,613 deaths being reported. ANTHRAX caused 1,215 deaths, an increase from 796 during the previous year. There was an increase from 336 to 424 deaths reported due to BLACKLEG. Only one death from GLANDERS was reported. SURRA caused death in 179 ponies and 11 cattle. FOOT AND MOUTH DISEASE was widespread, only nine districts escaping infection. There were only 96 deaths. RABIES caused two deaths in cattle. RINDERPEST was the most important contagious disease causing losses, only 3,929 deaths being recorded as compared with 11,161 in 1937–38.

The need for compulsion in dealing with the prophylactic treatment of animals passing through quarantine is stressed. During the year, 43,141 animals were treated with HAEMORRHAGIC SEPTICAEMIA vaccine. ANTHRAX vaccinations were:– bovines 12,702, equines 188, and elephants 331, there being an increase of 4,780 in bovines on the 1937–1938 figures. There were also 2,948 elephants vaccinated by private persons. Spore vaccine gave very satisfactory results. STRANGLES autogenous vaccine was used on 563 animals at Pyawbwe stud farm. Preventive inoculations were carried out with desiccated goat-spleen virus against RINDERPEST; 419,354 animals were treated.

The veterinary laboratory at Insein examined

2,740 blood-smears, 599 samples of faeces, and 219 other specimens. The doses of vaccines issued were ANTHRAX spore vaccine 50,570, HAEMORRHAGIC SEPTICAEMIA vaccine 72,340, and RINDERPEST desiccated spleen virus vaccine 610,900. The immunity conferred by the rinderpest vaccine used was found to be solid after 37 months in six cattle. Details are given of the research carried out on the use of the desiccated spleens of rinderpest-infected goats as a prophylactic against rinderpest in cattle and buffaloes. The results have not been satisfactory in use on buffaloes. The glycerin water vaccine used successfully by BENNETT in the Sudan, was not found to have any protective value when used on susceptible animals in Burma. The dose of naganol recommended for the treatment of SURRA in elephants is 1 oz. One eight-year-old elephant had a temperature reaction only to the subcutaneous injection of rinderpest virus. MICROFILARIAE were found in the blood of several elephants but no opportunity occurred for a P.M. examination. Great difficulty is experienced in treating elephants for intestinal HELMINTH INFESTATION.

There is a chapter on stock breeding and a summary which discusses and makes recommendations for dealing with the local difficulties in combating diseases of animals in Burma. —J. A. GRIFFITHS.

BRITISH GUIANA. (1940). **Report on Livestock and Veterinary Division for the Year ending 1938.** [FRASER, H. A.]—*Rep. Dep. Agric. Brit. Guiana, 1938.* pp. 88–90.

There was much sickness among horses and cattle from CORYZA and PNEUMONIA; this was attributed to the prolonged rainfall throughout the year, which caused flooding of the pastures and loss of condition through lack of grazing. ANTHRAX was reported from two areas on the east coast of Berbice. TUBERCULOSIS among dairy cows on the sugar estates was dealt with by slaughter of infected cows. Very few herds are tested for TB. as a routine measure. HAEMORRHAGIC SEPTICAEMIA occurred on the Island of Wakenaam. Intestinal HELMINTHS were a cause of deaths among sheep. The incidence of KIDNEY WORM in swine is remarkably high as observed in the abattoirs.

The greater part of the report deals with animal husbandry. The main difficulty in maintaining livestock is the shortage of pasture and of locally grown feeding stuffs which can be used as concentrates. The pastures of the coastland are low lying and easily swamped, while the limited amount of pasture that is available on the better drained areas of the sugar estates is very much overstocked. The best-conditioned beef cattle come from the county of Essequibo where the pastures are adequate and the calves are allowed sufficient milk, there being difficulties in the marketing of milk. Exports of livestock were 1,111 cattle and 941 pigs to Trinidad.—J. A. GRIFFITHS.

FRENCH WEST AFRICA. (1940). État sanitaire du cheptel et fonctionnement des laboratoires en 1938. **[Report on Animal Health and Laboratory Work for 1938].** —*Bull. Serv. zootech. Epiz. A.O.F.* **3.** No. 1. 31–63. 1 table.

GENERAL

No details are given about staff or expenditure.

LIVESTOCK DISEASES

BACTERIAL DISEASES.—Here and there losses were caused from ANTHRAX. Notes are given for French Guinea, Niger, Ivory Coast, and Senegal. Vaccination was employed on a large scale in French Guinea. HAEMORRHAGIC SEPTICAEMIA occurred in cattle in Dahomey and in the Ivory Coast, and in sheep in Senegal. FOWL CHOLERA caused losses in the Ivory Coast. TUBERCULOSIS is not rare; 82 cases were observed in the French Sudan in cattle, and 37 cases at Dakar (8 cattle and 29 pigs). FOWL TYPHOID in the Ivory Coast was controlled by a vaccine. Vaccination against BLACKLEG was carried out in Niger and a few cases of TETANUS were observed in Senegal. EPIZOOTIC LYMPHANGITIS occurred in Senegal, mercury biniodide given intravenously being said to give good results. STREPTOTHRICOSIS caused appreciable damage to hides in the Niger province.

PROTOZOAN DISEASES.—An account is given of TRYPANOSOMIASIS in cattle, horses, and camels in all five colonies of the A.O.F. Naganol, atoxyl, tartar emetic, and trypars-amide were used to a small extent. PIROPLASMOSIS in French Guinea was effectively controlled by trypanblue. It also occurred elsewhere in the A.O.F.

VIRUS DISEASES.—RINDERPEST occurred in all five colonies and was controlled by quarantine and by immunization by various methods. 570,000 animals were immunized. CONTAGIOUS BOVINE PLEURO-PNEUMONIA also occurred in all five colonies. A formol vaccine was used

for its control, and novarsenobenzol was used for curative purposes. AFRICAN HORSE SICKNESS occurred in Senegal, FOOT AND MOUTH DISEASE in French Sudan and Niger, and SHEEP POX, BLUE TONGUE, and CONTAGIOUS ECTHYMA (in goats) in the French Sudan. A few cases of RABIES were observed in all five colonies and DOG DISTEMPER was quite common. PLEURO-PNEUMONIA of goats was common in Niger. No reliable vaccine has yet been found for it.

PARASITIC DISEASES.—Brief notes are given on the occurrence of BOVINE CYSTICERCOSIS, ASCARIASIS in horses and calves, HOOKWORM in dogs, and MANGE in sheep, goats, camels, and dogs.

LABORATORY WORK

An account is given of the work at the laboratories at Dakar (Senegal), Bamako (French Sudan), and Niamey (Niger), and of serum and vaccine production at eight further centres. The Dakar laboratories produced a wide range of vaccines and carried out 684 microscopic diagnoses. Research was carried out on HAEMORRHAGIC SEPTICAEMIA with the object of producing a reliable vaccine, but complete success has not yet been obtained. A short account is given of *Pasteurella pseudo-tuberculosis* infection in sheep, rabbits, and fowls, *Pseudomonas pyocyanea* infection in g. pigs and a case of *Trypanosoma congolense* infection in a dog.

At Bamako a small amount of RINDERPEST serum and vaccine was produced as well as vaccines against ANTHRAX, PASTEURELLOSIS and CONTAGIOUS BOVINE PLEURO-PNEUMONIA. Research on RINDERPEST was devoted to a bile vaccine which proved inferior to saponin vaccine; the latter is considered to confer a solid immunity of at least 18 months' duration. An attempt was made to grow rinderpest virus in tissue culture. An unsuccessful attempt was made to raise the titre of rinderpest antiserum by hyperimmunization of the serum producers with virulent organ suspension; the reactions which developed were excessively severe. Work on a lanolin vaccine against BOVINE CONTAGIOUS PLEURO-PNEUMONIA was begun. Trials with an exotuberculin are also described. Notes are given on TRYPANOSOMIASIS, PIROPLASMOSIS, EPIZOOTIC LYMPHANGITIS and BLASTOMYCOSIS, on POISONING OF FOWLS by a polydesmid myriapod, the toxin of which consists of hydrocyanic acid, and on the titration of formalin for use in vaccine production.—L. TOBBACK.

BOOK REVIEW

CHAMBERS, E. G. [M.A., Assistant Director of Research in Industrial Psychology, Cambridge: Fellow of the Royal Statistical Society]. (1940). **Statistical Calculations for Beginners.** pp. viii+110. 4 figs., 5 appendixes. Cambridge: University Press. [8vo] [7s. 6d.]

This short book should prove useful to anyone wishing to learn how to make use of the commoner statistical methods. No assumption of mathematical ability is made. The calculations described involve the use of arithmetic and an ability to apply the formulas and utilize the tables provided. A worked example of each method is given and exercises with answers are supplied. The chapters deal successively with description of terms, averages, dispersion, normal distribution, significance of mean and difference between means, correlation, regression and correlation ratio, contingency, and goodness of fit.

In claiming that the student who works conscientiously through the exercises should be able to use the technique intelligently, the author enjoins him never to forget that statistical methods are merely tools which enable him to describe, relate, and assess the value of his observations, but tell him nothing about the materials he is using. "No carpenter's tools have ever yet made a piece of wood; similarly no statistical method ever yet produced a biological fact." The outcome of each calculation is a statistical statement which has to be interpreted in terms of the particular branch of science from which the data are drawn. It follows that it is more important for the biologist to understand the specific purpose of each type of statistical method, and to design his experiments in such a way that his subsequent observations are capable of informative statistical manipulation, than it is for the mathematical statistician to have expert knowledge of the various sciences to which his general technique is applied. This little book should serve a useful purpose in educating the non-mathematical biologist, irrespective of his special branch of knowledge.—H. H. GREEN.

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